

Laparoscopic Sleeve Gastrectomy

A Newcomer to Bariatric Surgery

By Stacy Brethauer, MD, and Philip Schauer, MD

As patients begin investigating surgical weight-loss options, one of the first questions to arise is “what procedure is best for me?” The answer to this question must come after thorough research regarding the risk and benefits of each procedure and an evaluation to determine the individual patient’s risk for undergoing surgery.

About 80 percent of the bariatric procedures performed in the United States are gastric bypass procedures. The other 20 percent are comprised of restrictive procedures, such as the laparoscopic adjustable gastric band. The laparoscopic sleeve gastrectomy (LSG), a relative newcomer to bariatric surgery, is growing in popularity.

The sleeve gastrectomy originated as the restrictive part of the duodenal switch operation. In the last several years, though, it has been used by some surgeons as a staging procedure prior to a gastric bypass or duodenal switch in very high risk patients. It has also been used as a primary, stand-alone procedure by some surgeons.

How is Sleeve Gastrectomy Performed?

The majority of sleeve gastrectomies performed today are completed laparoscopically. This involves making five or six small incisions in the abdomen and performing the procedure using a video camera (laparoscope) and long instruments that are placed through these small incisions.

During the sleeve gastrectomy, about 75 percent of the stomach is removed leaving a narrow gastric tube or “sleeve” (*see picture on page 7*). No intestines are removed or bypassed during the sleeve gastrectomy. This procedure takes one to two hours to complete. This short operative time is an important advantage for patients with severe heart or lung disease.

How Does the Sleeve Gastrectomy Cause Weight-Loss?

Sleeve gastrectomy is a restrictive procedure. It greatly reduces the size of the stomach and limits the amount of food that can be eaten at one time. It does not cause decreased absorption of nutrients or bypass the intestines. After this surgery, patients feel full after eating very small amounts of food. Sleeve gastrectomy may also cause a decrease in appetite. In addition to reducing the size of the stomach, the procedure reduces the amount of the “hunger hormone,” ghrelin, produced by the stomach.¹ The duration of this effect is not clear yet, but most patients have significantly decreased hunger after the operation.

Who Should Have a Sleeve Gastrectomy?

This operation has been used successfully for many different types of bariatric patients.² Since it is a relatively new procedure, there is no data regarding weight-loss, complications or weight regain beyond three years. At the Cleveland Clinic, we use this procedure as part of a staged approach for high-risk patients. Patients who have a very high body mass index (BMI) or severe heart or lung disease may benefit from a shorter, lower risk operation such as the sleeve gastrectomy as a first stage procedure. Sometimes, the decision to proceed with the sleeve gastrectomy is made in the operating room due to an excessively large liver or extensive scar tissue to the intestines that make gastric bypass impossible.

In patients who undergo LSG as a first stage procedure, the second stage (gastric bypass) is performed 12 to 18 months later after significant weight-loss has occurred, the liver has decreased in size and the risk of anesthesia is much lower. Though this approach involves two procedures, we believe it a safe and effective strategy for selected high-risk patients.

LSG is also being used as a primary weight-loss procedure in lower BMI patients. Because this is a more recent application

of this procedure, it is currently being performed as part of an investigational protocol for this lower BMI patient group.

How Much Weight-loss Occurs after LSG?

Several studies have documented excellent weight-loss up to three years after LSG.^{3,6} In higher BMI patients who undergo LSG as a first stage procedure, the average patient will lose 40 – 50 percent of their excess weight in the first two years after the procedure.⁴ This typically equates to about 125 pounds of weight-loss for patients with a BMI greater than 60.

Patients with lower BMI's who undergo LSG will lose a larger proportion of their excess weight (60 – 80 percent) within three years of the surgery.^{3,5,6} Weight-loss after LSG has been directly compared to Laparoscopic Adjustable Gastric Banding (LAGB). In a randomized trial comparing LSG to LAGB, LSG resulted in better weight-loss at three years (66 percent versus 48 percent excess weight-loss). Additionally, more than 75 percent of patients will have significant improvement or resolution of major obesity-related co-morbidities such as diabetes, hypertension, sleep apnea and hyperlipidemia following sleeve gastrectomy.^{4,5,7,8}

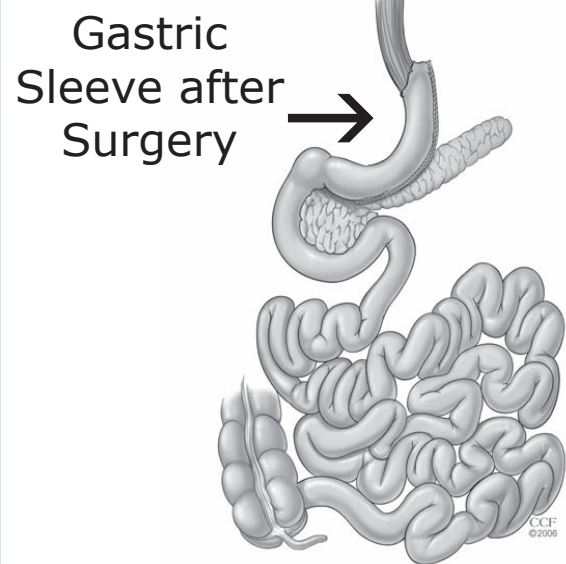
What are the Risks of Sleeve Gastrectomy?

The risk of major post-operative complications after LSG is 5-10 percent, which is less than the risk associated with gastric bypass or malabsorptive procedures such as duodenal switch. This is primarily because the small intestine is not divided and reconnected during LSG as it is during the bypass procedures. This lower risk and shorter operative time is the main reason we use it as a staging procedure for high-risk patients.

Complications that can occur after LSG include a leak from the sleeve resulting in an infection or abscess, deep venous thrombosis or pulmonary embolism, narrowing of the sleeve (stricture) requiring endoscopic dilation and bleeding. Major complications requiring re-operation are uncommon after sleeve gastrectomy and occur in less than 5 percent of patients.

Is LSG a Good Choice for Me?

You should first know the risks and benefits of sleeve gastrectomy, adjustable gastric banding and gastric bypass. For high-risk patients and patients with very high BMI's, we discuss LSG as a first-stage procedure prior to gastric bypass. We are also conducting a clinical



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trial that includes sleeve gastrectomy for lower BMI patients with diabetes. Ultimately, the decision regarding which procedure to perform is based on each patient's operative risk and their expectations and goals for surgical weight-loss.

* References for this article may be found in the online version of this article in the October issue of "OAC News" located at www.obesityaction.org.

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Sleeve gastrectomy may be performed for the following reasons:

- Body Mass Index is greater than 60
- Severe comorbidities (cardiac, pulmonary, liver disease)
- Advanced age
- Inflammatory bowel disease (Crohn's disease)
- Need to continue specific medications (anti-inflammatory medicines, transplant medications)
- Need for continued surveillance of the stomach (that couldn't be evaluated after a gastric bypass)
- Severely enlarged liver found during the operation
- Severe adhesions (scarring) to the bowel found during the operation
- Any combination of the above that significantly increases the patient's risk

Weight Loss Surgery Risks and Side Effects

Weight loss surgeries are major operations that carry with them substantial operative and post-operative risks as well as short and long-term side effects. It is important that you understand these risks and side effects before deciding on having this procedure.

If you do decide to have surgery, you will be asked to sign a form stating you understand the risks and side effects and are encouraged to ask any questions you may have at the time of your consultation or any time prior to your surgery. Please carefully read all the information that you have been given, and feel free to discuss any issues you may have with us, your family, friends, or any other medical professional. We will describe the most common risks and side effects, but you should keep in mind that other complications may happen or develop at any time during or after your surgery. Also keep in mind that all the long-term effects of these procedures are not yet known since weight loss surgeries have been performed with frequency for only the past few decades.

RISKS

BLEEDING

With any major surgery, bleeding can occur. If sufficient blood volume is lost, blood or plasma transfusions may be necessary. There is approximately a 1 in 500,000 risk of contracting AIDS or hepatitis from a blood or plasma transfusion. In our experience, the need for a transfusion is uncommon in patients who have not had any previous abdominal surgery. However, this risk is substantially higher in patients who are undergoing revisional or re-do operations or in patients who are already anemic (have low blood counts) before surgery.

ABCESS/PERITONITIS

An abscess/peritonitis is a severe infection inside the abdominal cavity. When this occurs, additional operations may be required to drain and or control the underlying infection. An abscess/peritonitis is usually the result of leakage of bowel contents from the stomach or intestine. If it occurs, it is usually detected within the first few days after surgery before your discharge from the hospital but occasionally may occur at a later time.

DEEP VENOUS THROMBOSIS (DVT)

Obese patients tend to have poor blood flow in their lower legs. Therefore, when obese patients undergo surgery of any type, blood tends to pool or stagnate in the lower legs and may clot in the leg or pelvic veins. These clots can restrict the venous drainage of blood from the leg resulting in significant leg swelling and pain. This may lead to more serious complications (see Pulmonary Embolus) and require long-term treatment with a blood thinner.

PULMONARY EMBOLUS (PE)

When a blood clot from the leg breaks loose and travels to the lung, it is called a pulmonary embolus. Like a deep venous thrombosis, it is a risk of any type of surgery in an obese patient and occurs in approximately 1% of cases. Special precautions are taken in the operating room and after your surgery to avoid the development of deep venous thrombosis and pulmonary emboli. **This complication is responsible for the majority of deaths in patients undergoing weight loss surgery.** The best way to prevent this complication is to walk as soon as possible after surgery as the highest risk period for this to happen is the first few weeks after surgery.

WOUND INFECTIONS

Because the abdominal wall subcutaneous (fat) tissue heals poorly, it tends to get infected very easily. These wound infections are self-limited and are usually treated by opening up the skin incision and allowing the wound to drain and heal from the bottom up. This is our most common postoperative complication. Some patients who we consider at higher risk for a wound infection will not have their skin incision closed completely at the time of surgery, therefore, preventing this complication but requiring daily or twice daily dressing changes.

DECUBITUS ULCERS/PRESSURE SORES

Decubitus ulcers or pressure sores are secondary to excess weight or pressure being placed, usually around the buttock area, in one place for too long. This is yet another reason for patients to get up in a chair or out of bed to walk as soon as they can after surgery. If decubitus ulcers or pressure sores do develop, additional operations may be necessary to help prevent any infection that may develop and spread to the surrounding tissue.

SPLENECTOMY

The spleen is a very fragile organ that lies immediately adjacent to the operative field. It can be easily injured and if it is may need to be removed. The spleen serves as a filter for blood, as well as an immune organ. Patients without spleens generally do quite well but there is increased susceptibility to certain kinds of infections throughout their lifetime.

HERNIA

Because of the great amount of stress that is placed on the abdominal incision after surgery the wound frequently does not heal together completely. This results in an incisional hernia. In our experience, an incisional hernia occurs in the majority of patients and generally requires a second operation about a year or two later after adequate weight loss has been achieved. At the same of the hernia repair, we usually remove any excess skin or tissues that have developed as a result of your weight loss.

BOWEL OBSTRUCTION

Any abdominal surgery has the risk of causing a bowel or intestinal obstruction. This can occur at any time in the future and is usually caused by scar tissue formation (“adhesions”) inside the abdomen. The risk of forming adhesions that can lead to a bowel obstruction is 3-5% and the need for a surgical procedure/operation to release the bowel or lyse the adhesions is approximately 1%. Scarring can also form around the loops of the bowel, partially obstructing them. This may result in chronic abdominal pain, nausea, and/or vomiting. It is possible that additional hospitalizations or surgeries might be necessary in some patients after weight loss surgery for this complication.

MYOCARDIAL INFARCTION AND STROKE

The stress of major surgery can result in a heart attack or stroke. Fortunately, this complication is extremely rare.

WEIGHT GAIN BEFORE SURGERY

We have observed that patients who gain weight before surgery are at higher risk for all the above mentioned complications and especially the need for being on a ventilator after surgery. We, therefore, ask that patients lose 5-15 pounds in the 2-3 weeks before their surgery to help decrease these risks.

CIGARETTE SMOKING

In general, patients who smoke are also at higher risk for complications after surgery. Including pneumonias, poor wound healing, stomach ulcer formation (leading to intestinal bleeding), pulmonary embolism, and death. Patients are urged to discontinue smoking 3 months prior to surgery to help decrease their risk from these complications.

DEATH

There is approximately a 1-2% incidence of dying after undergoing surgery for weight loss. As stated above, the most common cause of death is a result of blood clots to the lung called pulmonary emboli. It is our experience that patients who have lost the ability to ambulate (walk) are the highest risk for major post-operative complications or death. It is, therefore, extremely important that you walk or exercise as much as you can prepare for this surgery.

SIDE EFFECTS

ANEMIA

Anemia (low iron) is inevitable since the stomach, duodenum, and jejunum are required for the normal absorption of iron and vitamin B-12. As you are aware, most of the stomach is removed or bypassed and duodenum and most of the jejunum are bypassed with weight loss surgeries. Therefore, patients undergoing this surgery need life-long medical and laboratory test follow-ups. It is essential that you take iron and other vitamin and mineral supplements for rest of your life. We generally recommend taking an oral prenatal vitamin for iron replacement, but some patients may require periodic iron or vitamin B-12 injections to supplement their oral intake.

CALCIUM AND FAT SOLUBLE VITAMIN DEFICIENCIES

Calcium absorption and metabolism are also disturbed after weight loss surgery. This can result in bone loss or osteoporosis. We recommend oral calcium supplements of 1000-1500 mg per day to avoid the future development of osteoporosis. In some patients Vitamin A, D, E and K (fat-soluble vitamins) supplements may also be necessary.

BOWEL HABIT CHANGES

Most patients experience some change in their bowel movements/habits after weight loss surgery. The most common side effect is an increase in flatus or passing gas. This is a result of undigested fats being broken down by bacteria present in the colon. This flatus/gas, is, in general, more malodorous after a patient has had surgery. We have found that most patients have 2-4 bowel movements per day, but some patients may have no noticeable change and some may have more depending on the amount of fat that one eats in their diet.

NAUSEA AND VOMITING

Anytime the stomach is operated upon nausea may develop. Nausea can be significant for several days, weeks, or months after surgery. Vomiting may also occur but is unusual and if it persists and we should notified. Because there are occasional patients who have problems with nausea and vomiting, we place a feeding J-Tube at the time of the surgery so that we can feed nutrients and fluids directly into the intestine even while you are at home.

HAIR LOSS

Almost all patients will experience some thinning of their hair during the first six months to a year after surgery. This is due to lack of adequate protein in their diet. This is almost always a reversible side effect as your protein intake gradually increases over time.

REVISABILITY AND REVERSIBILITY

Most weight loss procedures are revisable to some extent. If for some reason we recommend, or you decide to have a revision, it is important to recognize that the part of the stomach that was removed can never be put back. The most common reasons for a revision include too much weight loss, chronic diarrhea, vitamin, mineral, or nutritional deficiencies, chronic abdominal pain or bowel obstructions.