Vertical sleeve gastrectomy is major surgery that is performed on patients who are often in poor medical condition. While many complications can be prevented by thorough preparation before surgery, skillful anesthesia, and careful surgery, some complications occur anyway.

Major complications include bleeding from the staple line (0.5%) requiring transfusion or possible reoperation, staple line leaks (1%), and pulmonary embolism (blood clot to the lungs) (0.4%). Other problems include the sleeve being too tight because of scarring or the development of a partial twist. Injury to other abdominal organs such as the spleen, or intestine is possible although very uncommon. The mortality rate after vertical sleeve gastrectomy has been reported in the range of 1/500 (0.2%). Causes of death include blood clot to the lungs, infection following leaks, pneumonia, cardiac irregularities or heart attack, stroke, and other rare events.

Long term problems can include esophageal reflux, gastritis, and rarely bowel obstruction due to adhesions (scars inside of the abdomen). Vitamin deficiency can occur if patients do not eat a healthy diet and do not take certain vitamin supplements. The supplements include multivitamins, B12, and in some cases iron. Depending on a person's metabolism, other vitamins may be necessary. Vitamin levels can be checked with a blood test, so long term deficiencies can definitely be prevented.

**Esophageal reflux**

One of the problems that some patients face after sleeve gastrectomy is esophageal reflux. Reflux causes heartburn and esophagitis. It may occur soon after sleeve gastrectomy or may appear after several years. There are probably several causes for reflux, and the problem has not been extensively researched. The sleeve itself can be obstructive. It is a long narrow tube, and if too tight, may not function well. Second, a patient may develop problems with motility of the esophagus or with the sphincter muscle between the esophagus and stomach. And third, some patients may develop a hiatus hernia. A hiatus hernia is a widening of the diaphragm at the point where the esophagus passes from the chest into the abdomen. When a hiatus hernia develops, the stomach slips into the chest and the sphincter at the end of the esophagus is less effective. With a weakened sphincter muscle reflux occurs.

The first line of treatment for reflux is use of acid blockers and avoidance of acid stimulating
Vertical Sleeve Gastrectomy Risks and Complications

foods. A hiatus hernia can be repaired if one develops. If antacids and hiatal hernia repair don’t work, the sleeve gastrectomy can be converted to a gastric bypass. Here are two medical journal articles that discuss this problem.

Conversion from sleeve gastrectomy to Roux-en-Y gastric bypass--indications and outcome.

Department of Surgery, Division of General Surgery, Medical University of Vienna, Waehringer Guertel 18-20, 1090 Vienna, Austria.

Abstract
BACKGROUND: Due to excellent weight loss success in the short-time follow-up, sleeve gastrectomy (SG) has gained popularity as sole and definitive bariatric procedure. In the long-term follow-up, weight loss failure and intractable severe reflux can necessitate further surgical intervention.

METHODS: A retrospective analysis of laparoscopic conversions from SG to Roux-en-Y gastric bypass (RYGB) was performed to assess the efficacy for reflux relief and weight loss success.

RESULTS: A total of eight out of 73 patients (11%) underwent conversion to RYGB for severe reflux (n=3) or weight regain (n=5) after a median interval of 33 months following laparoscopic sleeve gastrectomy. In one of the patients, a banded gastric bypass was performed. In both groups, conversion to RYGB was successful, as proton pump inhibitor medication could be discontinued in all patients presenting with severe reflux, and a significant weight loss could be achieved in the patients with weight regain within a median follow-up of 33 months. Postoperative complications were observed in only one patient as leakage at the gastrojejunostomy was successfully treated by temporary stent placement.

CONCLUSION: Conversion to RYGB is an effective treatment for weight regain or intractable reflux symptoms following SG. Thus, SG can be performed, intended as sole and definitive bariatric intervention, with conversion from SG to RYGB as an exit strategy for these complications.

Dilated upper sleeve can be associated with severe postoperative gastroesophageal dysmotility and reflux.


Department of General Surgery, Hadassah-Hebrew University Medical Center, POB 12000, Jerusalem 91120, Israel. andreik@hadassah.org.il
Abstract

BACKGROUND: Laparoscopic sleeve gastrectomy (LSG) is an effective bariatric procedure, and it can be done as an isolated LSG or in conjunction with biliopancreatic diversion bypass/duodenal switch (laparoscopic duodenal switch; LDS). Gastroesophageal reflux after LSG has been described, but the mechanism is unknown and the treatment in the severest cases has not been discussed. We describe a cohort of patients who have underwent an LSG or LDS, and have suffered from a severe postoperative gastroesophageal motility disorder and/or reflux, report on their treatment, and discuss possible underlying mechanisms.

METHODS: Seven hundred and six patients underwent an LSG by two of the authors (AK, AB). Sixty nine patients underwent laparoscopic sleeve gastrectomy in Hadassah Medical Center, Jerusalem, Israel (January, 2006 and December 2008; 55 isolated LSG, 14 with LDS), and 637 (212 isolated LSG, 425 LDS) in Clinica San Jorge and Alcoy Hospital in Alcoy, Spain, (January 2002 and November 2008).

RESULTS: Of them, eight patients who has suffered from a gastroesophageal dysmotility and reflux disease postoperatively and needed a specific treatment besides regular proton pump inhibitors (PPIs) were identified (1.1%).

CONCLUSION: A combination of dilated upper part of the sleeve with a relative narrowing of the midstomach, without complete obstruction, was common to all eight patients who suffered from a severe gastroesophageal dysmotility and reflux. The sleeve volume, the bougie size, and the starting point of the antral resection do not seem to have an effect in this complication. Operative treatment was needed in only one case out of eight; in the rest of the patients, medical modalities were successful. More knowledge is required to understand the underlying mechanisms.

Staple line leak

Staple line leaks occur infrequently with all abdominal surgeries where staple are used to divide and or connect bowel. The cause of such leaks is usually an area of tissue weakness along the staple line. When the weakened tissue breaks down, fluid from within the stomach leaks out causing an infection. Treatment has traditionally involved draining the leak, repairing it if possible, and then supporting the patient with adequate nutrition as the leak heals. The
incidence of leaks varies from zero to 3 percent after sleeve gastrectomy. Various reinforcement techniques are often used, but none is completely effective. A new technique has been introduced to hasten recovery from leaks. A self expanding tube called a stent can be introduced into the sleeve with the help of an endoscope. The stent expands to close the leak. The stent is hollow allowing passage of food into the stomach during the healing process. Here is a report of three patients treated successfully with stents.

**The use of endoscopic stent in management of leaks after sleeve gastrectomy.**

NT, Nguyen XM, Dholakia C.
Department of Surgery, University of California, Irvine Medical Center, 333 City Blvd. West, Suite 850, Orange, CA 92868, USA. ninhn@uci.edu

**Abstract**

Gastric leak after sleeve gastrectomy can lead to significant morbidity and mortality. The aim of this study was to examine the safety and efficacy of endoscopic deployment of a covered esophageal stent in the management of leaks after sleeve gastrectomy. Three consecutive patients who underwent sleeve gastrectomy at outside institutions presented with leaks. All three patients underwent endoscopic placement of a covered stent. Additional procedures included laparoscopic or percutaneous drainage of abdominal collection(s). The patients were two women and one man, with a mean age of 34 years. One patient presented acutely at day 7 after the index operation and two patients presented late at 6 and 9 months, respectively. Two patients had proximal gastric leaks and one patient had a proximal gastric leak with a concomitant obstruction at the mid-aspect of the gastric sleeve. Endoscopic deployment of a covered stent was successful in all cases. There were no complications relating to the stent placement. The stent was removed at 6 weeks in two patients and at 4 months in one patient. The use of endoscopic stent was a safe and effective option in the management of leaks after sleeve gastrectomy.

**Bleeding**

The incidence of staple line bleeding requiring a transfusion is about 1% following vertical sleeve gastrectomy. Almost all patients who undergo obesity surgery are placed on low doses of blood thinners before surgery to prevent blood clots that can go to the lungs. A side effect of the blood thinners is a bleeding tendency. Fortunately bleeding is uncommon and the blood thinners are quite effective at reducing risk. It would be extremely rare for a patient to die from
such blood loss with the availability of modern blood banking. If a patient will not accept a blood transfusion because of religious reasons, the surgeon might recommend early return to the operating room to stop the bleeding surgically rather than run the risk of a fatality due to blood loss.