

Review Article

Advantages and disadvantages of endoscopic sleeve gastropasty versus laparoscopic sleeve gastrectomy

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ABSTRACT

Obesity and its associated comorbidities, such as diabetes mellitus, hypertension, and cardiovascular disease, are one of today's most pressing health issues and increasing incidence of obesity has marked it a global health challenge. For obese individuals with a high risk of morbidity and mortality who have not lost enough weight with lifestyle and medicinal care and who are experiencing the repercussions of obesity, bariatric surgery should be taken into consideration. Significant weight loss, the remission of coexisting diseases, and an improvement in quality of life are all possible outcomes of bariatric surgery. Laparoscopic procedures account for 96% of all bariatric procedures performed globally, with laparoscopic sleeve gastrectomy (LSG) being the most popular and prevalent. The current gold standard for bariatric surgery is LSG, since it is associated with significant complications such as gastroesophageal reflux disease hence a less invasive replacement for LSG was developed, which is endoscopic sleeve gastropasty (ESG). In the past few years, ESG, a relatively new technique of endoscopic bariatric therapy, has become more well-known. Several multi-center studies have established the safety, viability, repeatability, and potential for reversibility of ESG. Although it is inferior to LSG in terms of percentage of total body weight loss (TBWL), but within a year of follow-up, it carries a reduced risk of unfavourable outcomes than other surgical procedures. The purpose of this research is to review the available information about advantages and disadvantages of ESG versus LSG.

Keywords: Obesity, ESG, LSG, Bariatric

INTRODUCTION

Obesity is a growing global public health issue. Obese patients are significantly more likely to develop various

diseases, such as cardiovascular disease, gastrointestinal disorders, type 2 diabetes, joint and muscular disorders, respiratory issues, and psychological problems. These conditions may have a significant impact on patient's daily

lives and raise mortality risks. Although there are many illnesses linked to obesity, even modest weight loss may help individuals lower their risk for cardiovascular diseases, diabetes, obstructive sleep apnea, and hypertension, among many other comorbidities.¹ As per the statistics from the World Health Organization from 2016, 13% of adults worldwide were obese. In contrast, the Eastern Mediterranean Region's adult obesity prevalence grew from 15% in 1980 to 21% in 2015, according to estimates from the Global Burden of Diseases 2015. This is a significant rise from the 12% global average for 2015.² Obesity is on the rise and is linked to serious health and economic consequences for society. Traditional treatments like medication and lifestyle changes are still crucial but have limitations in terms of weight loss. Surgery for metabolic and bariatric conditions can help people lose weight and significantly improve their associated conditions and quality of life.³

The development and effectiveness of bariatric surgery are a result of the increased incidence of obesity and the significant number of people who do not respond to medicinal weight-loss programs. Despite the fact that bariatric surgery was initially only intended to help people lose weight, it has subsequently changed to help them improve health. Bariatric surgery has been shown in numerous randomized trials and prospective cohort studies to be superior to standard medical care for weight loss as well as, more importantly, to have a number of health benefits, such as better glycemic control and decreased morbidity and mortality from cardiovascular disease and even cancer. A number of weight-independent methods by which bariatric surgeries affect metabolic health have been identified via observation and investigation of the major metabolic impact of these treatments. With the widespread use of minimally invasive techniques, improved recovery programs, and a dedication to data reporting, surgical procedures have also advanced, and outcomes have improved over the past ten years.⁴

The Roux-en-Y gastric bypass, sleeve gastrectomy, adjustable gastric band, and duodenal switch are examples of modern bariatric procedures. Laparoscopic approach is now used for the majority of these surgeries, with its primary benefits including a quick recovery, a reduction in postoperative pain, and a decrease in complications related to wound.⁵ Laparoscopic procedures account for 96% of all bariatric procedures performed globally, with laparoscopic LSG being the most popular and prevalent. However, bariatric operations like the laparoscopic sleeve gastrectomy (LSG) have adverse effects of 10–17% and postoperative mortality of almost 0.3%, similar to other elective surgeries. Despite being much more successful than other weight loss methods, the LSG has a failure rate of 15–50% and a weight regain rate that ranges from 5% at two years to 70% at six years. There is now a demand for more accessible eligibility requirements and/or less severe significant adverse events in alternative successful weight loss techniques. This demand has been answered by minimally invasive endoscopic weight loss techniques like

the endoscopic sleeve gastroplasty (ESG), which is available for individuals with lower body mass index and comorbidities.⁶ The purpose of this research is to review the available information about advantages and disadvantages of ESG versus LSG.

METHODS

This study is based on a comprehensive literature search conducted on 23 November 2022, in the Medline and Cochrane databases, utilizing the medical topic headings (MeSH) and a combination of all available related terms, according to the database. To prevent missing any possible research, a manual search for publications was conducted through Google Scholar, using the reference lists of the previously listed papers as a starting point. We looked for valuable information in papers that discussed the information about advantages and disadvantages of ESG versus LSG. There were no restrictions on date, language, participant age, or type of publication.

DISCUSSION

Two gastric sleeve treatments that both attempt to decrease the gastric reservoir by forming a tubular sleeve design are increasingly gaining popularity and momentum among the available options. LSG physically excises the stomach's larger curvature, whereas ESG imbricates it, forming a tubular shape without impairing the gastric vascular or neural supply. In terms of annual surgical volume, LSG has eclipsed the tried-and-true Roux-en-Y gastric bypass to become the most popular bariatric and metabolic procedure in the United States. LSG is appealing because it requires less technical expertise, has a lower incidence of postoperative adverse events, and is effective in reducing comorbidities and attaining clinically significant long-term weight loss. However, current studies suggest a potential link between LSG and newly developing or worsening gastroesophageal reflux disease (GERD), which is more common in people with obesity.⁷ ESG is a safe and efficient weight-loss procedure that can shorten and widen the stomach by mimicking the anatomical structure of surgical sleeve gastrectomy. The benefits of ESG include minimally invasiveness, no need for a gastrectomy, repeatability, a straightforward procedure, no incision scar, few complications, a brief hospital stay, and a speedy postoperative recovery. For obese people who cannot handle or do not want to undergo surgery, ESG offers a novel option for weight loss as a middle ground between medical treatment and surgery.⁸ LSG and ESG techniques are depicted in (Figure 1).

LSG versus ESG; evidence from literature

Marincola et al. described in their study that the most well-liked bariatric procedure, LSG offers efficient weight loss and improvement in comorbidities. The goal of less invasive endoscopic alternatives like ESG, which have been proposed as technology has advanced, is to achieve the same efficacy results with fewer complications. ESG is

mostly recommended for people with mild to moderate obesity, however there are currently no guidelines that outline the conditions under which it is appropriate. Furthermore, after a year from the bariatric intervention, the results demonstrate a statistically significant small superiority for LSG compared with ESG in terms of excess weight loss. This can be ascribed to the two therapies' disparate modes of operation. Despite the flexibility of the remaining wall, the surgical treatment irrevocably lowers the stomach capacity and irreversibly eliminates a portion of the gastric wall. Contrarily, the endoscopic technique does not remove any of the stomach wall's components and leaves open the risk of a suture failure, particularly when coupled with the patient's poor eating habits. Between the two groups, there is no statistically significant difference in the incidence rate of adverse events.⁹ Alqahtani et al revealed in their findings that three-fourths of the weight lost by patients who received LSG was lost by those who underwent ESG. Studies have so far shown that ESG is safe, and it is widely used in therapeutic settings. The procedure's place in the hierarchy of weight loss therapies is still being assessed, though. Before undergoing more invasive procedures, several experts feel that ESG should be provided to all obese individuals.¹⁰

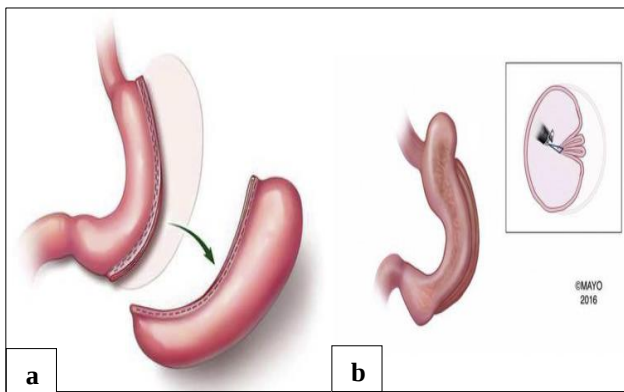


Figure 1: (a) LSG and (b) ESG techniques.⁷

Findings from a case-matched study showed that by age, sex, and body mass index, a total of 54 ESG patients and 83 LSG patients were matched, 16.7% of patients in the ESG group and 25.3% of patients in the LSG group had GERD at baseline, respectively. At the 6-month follow-up, the ESG group had a significantly lower percentage of TBWL relative to baseline than the LSG group (17.1% 6.5% versus 23.6% 7.6%). When compared to LSG patients, ESG patients experienced considerably fewer adverse events (5.2% versus 16.9%). The ESG group had considerably less new-onset GERD than the LSG group (1.9% versus 14.5%, $p=0.05$). With the proviso that LSG produced more adverse events and new-onset GERD than ESG, the minimally invasive same-day treatment ESG patients lost less weight at 6 months than LSG.¹¹ Lopez-Nava et al concluded in their study findings that even while ESG had a lesser weight loss than other methods, it had a better safety record and required less hospital stay.¹² Similarly, Novikov et al reported in their study findings

that in comparison to laparoscopic adjustable gastric banding and ESG, LSG had the highest percentage TBWL at the 12-month follow-up (29.28 versus 13.30 versus 17.57%, respectively; $p=0.001$). When compared to LSG or laparoscopic adjustable gastric banding, ESG had a considerably lower risk of morbidity ($p=0.01$). When compared to LSG or LAGB, the length of stay for ESG was considerably lower. The groups' readmission rates were not statistically significant. Despite the fact that LSG is the most successful weight loss option, ESG is a safe and practical endobariatric option with minimal morbidity and a limited length of stay in some patients.¹³

Results of meta-analysis showed that significant deviations in the 6-month, 12-month, and 24-month TBWL percentage favouring LSG over ESG were observed. Although there was a trend toward a decreased frequency of adverse events with ESG compared to LSG, the difference was not statistically significant. After ESG, there was a considerably lower incidence of new-onset GERD than after LSG (1.3% versus 17.9%, respectively). When compared to LSG, ESG achieved clinically sufficient weight loss, albeit less so in the short- and mid-term, and with fewer side effects, such as GERD. Due to its stomach-sparing properties and excellent safety profile, ESG offers individuals with mild to moderate obesity a suitable substitute for LSG.¹⁴ Alconero et al stated in their study that the remission of hepatic changes and weight loss are both successfully treated with LSG. LSG, however, is linked to both short-term and long-term postoperative complications. Treatments for obesity and metabolic comorbidities using bariatric endoscopic procedures promise to be less invasive and more affordable. ESG is one of the most promising new endoscopic procedures and is typically recommended for patients with mild to moderate obesity.¹⁵

Yoon et al described in their study that using a full-thickness endoscopic suturing device, ESG is a therapeutic endoscopic procedure for shrinking the gastric reservoir in obese individuals. ESG is much more effective at helping people lose weight than LSG and high-intensity diet and lifestyle treatment combined. In terms of percentages of excess body weight loss and TBWL, the efficacy at 12 months after ESG was roughly 16% and 60%, respectively. Good compliance with routine monitoring and post-procedure care with a multidisciplinary team approach are the well-known predicted factors for enhanced weight loss by ESG. Delay in stomach emptying and early satiation are two potential explanations for the weight reduction brought on by ESG, while the exact process is still up for debate. The incidence of new-onset GERD after ESG was low, and the pooled rate of adverse events after ESG reported in numerous meta-analysis studies varied from 1.5% to 2.3%, showing that ESG has a better safety profile than LSG. Additionally, ESG enhanced quality of life while lowering the risk of metabolic comorbidities associated with obesity, as seen by the decrease in HbA1c level, systolic blood pressure, triglyceride level, and risk of hepatic steatosis and fibrosis. ESG might be regarded as

risk-free and acceptable as an LSG substitute.¹⁶ Similarly, Fiorillo et al revealed in their findings that LSG may have a major negative impact on quality of life and aggravate gastrointestinal problems, such as GERD. ESG is a promising bariatric endoscopic treatment that is less intrusive and has shown to improve quality of life and comorbidities, which may make it more acceptable to patients earlier in their disease or when they are younger.¹⁷

Results of a meta-analysis concluded that when opposed to LSG, ESG produces less rapid weight reduction and has less side effects. After a year, the weight loss results for ESG seem to stagnate. The long-term evidence on ESG's potential for sustainable weight loss will define the technique's future and acceptance as a less invasive bariatric procedure.¹⁸ Mohan et al reported in their findings that given that ESG is a new treatment and has been performed by fewer surgeons, expert endoscopists rather than ordinary endoscopists than LSG, adverse events showed that ESG had a better safety profile. In addition to having a better safety profile, ESG procedures typically take between 45 and 80 minutes as opposed to 60 to 120 minutes for LSG, and hospital stays typically last between one and two days on average (1–2 days with ESG versus 5–9 days with LSG). The two most often reported adverse events subtypes of both operations were bleeding and GERD. When compared to LSG, the pooled bleeding event was lower with ESG (1.1 versus 2.6, $p=0.005$). GERD is a recognized adverse effect of LSG, and experts generally agree that the existence of GERD is a contraindication to LSG. ESG, unlike LSG, is not likely to put patients at risk for GERD. When compared to LSG, the pooled GERD rate with ESG was considerably lower (0.4 versus 6%, $p=0.001$).¹⁹

Findings of a study by Alqahtani et al showed that at 1, 2, and 3 years following ESG, the mean percentage of excess body weight loss was 77.1% 24.6%, 75.2% 47.9%, and 59.7% 57.1%, respectively. At 1, 2, and 3 years after LSG, the mean percentage of excess weight loss was 95.1% 20.5%, 93.6% 31.3%, and 74.3% 35.2%, respectively. At 1, 2, and 3 years, the mean difference in percentage of TBWL was 9.7%, 6.0%, and 4.8%, respectively. At each subsequent appointment, noninferiority was proven. Compared to 10 LSG patients, 14 ESG patients experienced adverse events. Following ESG versus LSG, the rates of comorbidity remission for diabetes were 64%, 66% for dyslipidemia and 51% for hypertension respectively.

While 28 patients experienced re-suturing after original ESG, while 80 ESG patients needed LSG revision for insufficient weight loss or weight recovery. Compared to LSG, ESG promotes non-inferior weight reduction with comparable safety and comorbidity resolution profiles.²⁰ Further clinical research and trials are needed to elaborately study the safety and effectiveness of both procedures LSG and ESG also it can help in designing strategies for reducing the complications associated with them.

CONCLUSION

ESG offers a higher safety profile, a shorter operation duration and length of hospital stay than LSG and is even reversible. Although LSG is associated with larger percentage of weight loss than ESG. To assess the benefits and cost-effectiveness of ESG with LSG, as well as to determine the long-term safety and efficacy of ESG, additional research and randomized controlled trials are required.

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