

**FACTORES DE RIESGO PARA LA CIRUGÍA REVISIONAL TRAS GASTRECTOMÍA  
VERTICAL LAPAROSCÓPICA: ANÁLISIS TRAS 10 AÑOS DE SEGUIMIENTO**

**RISK FACTORS FOR REVISIONAL SURGERY AFTER LAPAROSCOPIC SLEEVE  
GASTRECTOMY: ANALYSIS AFTER 10 YEARS OF FOLLOW-UP**

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LAPAROSCOPIC SLEEVE GASTRECTOMY: ANALYSIS AFTER 10  
YEARS OF FOLLOW-UP**

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## **ABSTRACT**

The aim of the study was to evaluate the incidence of revisional surgery (RS) after laparoscopic sleeve gastrectomy (LSG) in a series of patients after 10-years follow-up, as well as, indications and risk factors associated.

An observational single-centre study was performed on a cohort of 125 patients who underwent LSG between 2012 and 2021.

The incidence of RS in our series was 10.4% (13 patients). Main indications were gastroesophageal reflux in 11 patients (84.6%) follow by insufficient weight loss/weight regain (15.4%). Surgical procedure performed in all cases was laparoscopic Y-en-Roux gastric bypass (LYRGB). Type 2 diabetes and surgery-related data as the use of narrower calibration bougie and longer distance to pylorus when performing the first stapling, have been postulated in our cohort as potential predictive factors for LSG failure.

The early identification of risk factors for technical failure or complications' onset, would lead to an adequate selection of the surgical procedure and to minimize the impact of RS.

Keywords: sleeve gastrectomy, failure, revisional surgery.

## **INTRODUCTION**

Bariatric surgery (BS) is the most effective treatment for the control of morbid obesity obesity-related diseases. The combination with other therapeutic approaches as diet and lifestyle modification or medical therapy, strength its effects on this multifactorial disease (1).

Laparoscopic sleeve gastrectomy (LSG) has become the second procedure worldwide spread. Its appearing technical feasibility, low complication rate and acceptable short and mid-term results have constrained its rise over the last years (2). This increase in the number of procedures justify the chance for new reinterventions, either the failure to get the established target or the development of adverse events (3).

Revisional surgery (RS) after LSG failure poses a challenge for bariatric surgeons due to its increased complexity. The identification of predictive factors would provide a better selection of suitable primary surgical technique and an improvement of the results (3).

The aim of the study was to evaluate the incidence of RS after LSG in a range of patients after 10-years follow-up, as well as indications and risk factors associated.

## **METHODS**

Observational and single-centre study was conducted on a cohort of patients who underwent LSG between January 2012 and December 2021 in a third level hospital. Minimum follow up of a year was required.

Patients range from 18 to 65 years-old who fulfill general criteria for BS were included (4). Contraindications for LSG were severe gastroesophageal reflux disease, large hiatal hernia, adverse psychological evaluation and patients with scarce adherence to preoperative weight loss programme. LSG was performed laparoscopically following the standards published in several clinical guidelines.

Weight loss failure (WLF) was considered when the percentage of total weight loss (%TWL =  $[(\text{initial weight} - \text{current weight}) / \text{initial weight}] \times 100$ ) was <50% at 1-year after surgery, and weight regain (WR) to a rise of >10% of total weight regarding the minimum weight achieved.

Qualitative variables were expressed in percentages and compared by the Chi-square and Fisher's exact test. Quantitative variables were presented as median and interquartile range and evaluated by Mann-Whitney U test. A cutoff of  $p < 0.05$  was used for statistical significance. All calculations were performed by using the SPSS software package version 20.0 (SPSS, Armonk, NY).

The study protocol was completed with full approval from the local Ethics Committee. All participants gave written informed consent and principles of the Declaration of Helsinki were adopted.

## **RESULTS**

125 patients were included in the study, of whom 13 (10.4%) underwent RS. Main indications for RS were 11 cases (84.6%) of gastroesophageal reflux non controllable with medical therapy and 2 cases (15.4%) of WLF/WR. In all patients a widening of the gastric sleeve was observed and the RS performed was the laparoscopic Y-en-Roux gastric bypass (LYRGB), resizing the gastric pouch. Median time from primary surgery to RS was 54 (36-72) months and the median Body Mass Index (BMI) prior to RS was 48.55 (42.2-53.27) Kg/m<sup>2</sup>.

Among the different variables studied for the risk factor analysis (Table 1), type 2 diabetes ( $p=0.046$ ), longer distance to pylorus when performing the first staple ( $p=0.001$ ) and the utilization of wider calibration bougies ( $p=0.008$ ) were significantly related to RS. The presence of gastroesophageal reflux prior to primary surgery and the finding of hiatal hernia did not increase the probability of RS.

## **DISCUSSION**

RS has gain great value in most of bariatric teams due to its progressive increase. Estimated rate of RS after LSG varies in the literature published with numbers which range from 2.4 to 19.9% (3), comparable to the results obtained in our study (10.4%).

Gastroesophageal reflux refractory to antisecretory therapy and WLF/WR have been the main indications in our population. LSG is a

refluxogenic technique since it acts as a high intraluminal pressure pouch, so the higher risk to develop this complication seems to be conditioned for different technique factors (5). In our study the use of narrow calibration bougies and longer distance to pylorus to perform the first stapling have been related with the need of RS. In most cases, it addressed *de novo* reflux after LSG.

On the other hand, the efficiency of the LSG to achieve an optimal weight loss and an adequate control of long-term comorbidities is questioned, being its failure one of the main indications of RS in most of the series. As it is a mainly restrictive technique, it has been considered a suboptimal option for bariatric patients with metabolic comorbidities (6). Thus, the presence of diabetes has represented a significant risk factor for RS in our cohort.

Concerning the ideal time for RS there is no standardization. It requires an individual and careful evaluation to identify the probable mechanisms and risk factors that lead to failure. The median time in our series was 54 (36-72) months, varying depending on the cause of RS. Likewise, neither exist a “gold standard” technique for RS after LSG. The most used techniques are LYRGB and single anastomosis gastric bypass. Rayman *et al* compared both techniques as revision techniques, showing similarly effectiveness and safety (3). However, conversion to LYRGB in patients with gastroesophageal reflux symptoms should be the ideal option and so endorse most of the clinical guidelines (3). In our cohort, the procedure performed for all indications was the LRYGB with great efficiency for the reflux control.

The retrospective approach of the study represents its main limitation. Likewise, granting more importance to the multidisciplinary approach and the commitment of the patient in the modification of their lifestyle along with a better optimization and preoperative workout are the main key points to take into account to improve the selection of patients and results.

## **CONCLUSION**

Incidence of RS after LSG in our cohort is in compliance with published standards. Postoperative reflux and WLF/WR have been the main indications for RS at present study. The presence of type 2 diabetes as well as some technical aspects as the use of narrow calibration bougies and longer distance to pylorus to perform the first stapling have been claimed as predictor factors for failure in our series.

## **CONFLICT OF INTEREST AND FUNDING**

None.

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## **REFERENCES**

1. Wolfe BM, Kvach E, Eckel RH. Treatment of obesity: Weight loss and bariatric surgery. *Circ Res.* 2016;118(11):1844-55.
2. Climaco K, Ahnfeldt E. Laparoscopic vertical sleeve gastrectomy. *Surg Clin North Am.* 2021;101(2):177-88.
3. Rayman S, Assaf D, Azran C, Sroka G, Assalia A, Beglaibter N, et al. Sleeve gastrectomy failure-revision to laparoscopic one-anastomosis gastric bypass or Roux-n-Y gastric bypass: A multicenter study. *Obes Surg.* 2021;31(7):2927-34.
4. Ben-David K, Rossidis G. Bariatric surgery: indications, safety and efficacy. *Curr Pharm Des.* 2011;17(12):1209-17.
5. Popescu A-L, Ionița-Radu F, Jinga M, Gavrilă A-I, Săvulescu F-A, Fierbințeanu-Braticevici C. Laparoscopic sleeve gastrectomy and gastroesophageal reflux. *Rom J Intern Med.* 2018 ;56(4):227-32.
6. Borgeraas H, Hofsø D, Hertel JK, Hjelmesaeth J. Comparison of the effect of Roux-en-Y gastric bypass and sleeve gastrectomy on remission of type 2 diabetes: A systematic review and meta-analysis of randomized controlled trials. *Obes Rev.* 2020;21(6):e13011.