

## Original Research Article

# Short-term outcomes after long inverted versus short standard biliopancreatic limb in Roux-en-Y gastric bypass

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## ABSTRACT

**Background:** Obesity is a public health issue that affects the entire world and it is rising. Roux-en-Y gastric bypass is one of the most common bariatric procedures and it can reach a significant and sustained excess weight loss and efficient comorbidity control. The main objective was to compare short-term outcomes between standard versus long biliopancreatic limb gastric bypass patients.

**Methods:** it was a retrospective, comparative, descriptive, single-center study. We evaluated obese patients that underwent a laparoscopic Roux-en-Y gastric bypass with standard or long biliopancreatic limb in Centro Medico ABC, Mexico City, and compared general demographics, weight loss, excess weight loss, comorbidities and quality of life.

**Results:** Of 50 patients analyzed, 24 were in the standard gastric bypass (S-GB) and 26 in the long biliopancreatic limb (LBPL-GB). Mean weight loss in the S-GB group was  $33.1 \pm 12.1$  kg and in the LBPL-GB was  $40.2 \pm 12.6$  kg with a difference of 7.1 kg. The percentage of excess weight loss (%EWL) was  $72.5 \pm 14\%$  in S-GB and  $72.9 \pm 19\%$  in LBPL-GB, with a difference of 0.4% in the 12 months of follow-up. There was a complete reduction of hypoglycemic drugs in 80% in the S-GB group and 100% in the LBPL-GB group.

**Conclusions:** With this modification of the technique, we achieved important outcomes in regard of comorbidities, without affecting drastically weight loss or the EWL. This procedure is safe and feasible.

**Keywords:** Bariatric surgery, Gastric bypass, Long biliopancreatic limb bypass, Morbid obesity, Obesity, Standard bypass

## INTRODUCTION

Obesity is a complex pathology that goes beyond a simple eating disorder. It compromises each organ and system of the body to a greater or lesser extent. It is currently a pandemic and the forecasts indicate that it is on the rise, what is of concern at the public health level is that, due to its affectation in comorbidities, it causes significant expenditure in the health institutions of our country.<sup>1,2</sup>

The treatment requires the intervention of multiple specialists and it has been documented that surgery has

high percentage of effectiveness. During the evolution of bariatric procedures, key points have been found that significantly improve weight loss and the resolution of comorbidities.<sup>3,4</sup>

Bariatric surgery basically boils down to two procedures: gastric sleeve and Roux-en-Y gastric bypass. The latter is the one that offers the most radical changes in both the restrictive and malabsorptive sense.<sup>5</sup> It is true that it is a procedure with higher morbidity, however, it has been increasingly detailed and individualized that in consequence, patients can have an excellent quality of life.<sup>6-8</sup> The present study analysed the outcomes of the

gastric bypass with a long biliopancreatic limb compared with the standard procedure.

**METHODS**

A retrospective, descriptive, comparative, cross-sectional study, in Centro Medico ABC in Mexico City, between January 2015 and January 2020.

**Inclusion criteria**

The inclusion criteria were patients from ages 18 to 60, BMI>35 kg/m<sup>2</sup>, with a complete clinical record of at least 12 months of follow-up.

**Exclusion criteria**

The exclusion criteria were patients below 18 years old, BMI<35 kg/m<sup>2</sup>, open surgery, that went through surgery in another hospital and an incomplete clinical record with less than 12 months of follow-up.

We selected patients who had undergone Roux-en-Y gastric bypass surgery by laparoscopy, either with standard technique or long biliopancreatic loop.

**Surgical technique**

All procedures were standardized and performed by 3 surgeons. They were all done laparoscopic, with a gastric pouch of 30 to 50 ml with mechanical, antecolic gastro-jejunal anastomosis, closed with a running PDS 2-0 suture. In the control group the biliopancreatic limb was created at 80 cm and the alimentary limb at 150 cm, approximately. In the case group the biliopancreatic limb was created at 200 cm and the alimentary limb was created at 80 cm, approximately.

The study didn't have any ethical issues and was approved because of its retrospective nature. The sample size was 106 patients that underwent laparoscopic gastric bypass but due to loss of follow-up, we ended up with 50 patients in total. The main objective was to compare basal demographics of both groups and the outcomes in terms of weight loss, excess weight loss, reduction of hypoglycemic drugs and quality of life with the BAROS questionnaire, with a follow-up of 12 months.

**Statistical analysis**

Results were expressed as mean, percentage and standard deviation. Student's t test was performed for the qualitative variables with a p=0.05 of significance. Categorical variables were compared with the Chi-square test. Analysis was done using SPSS version 21.

**RESULTS**

Between first of January of 2015 and first of January of 2020, 106 laparoscopic gastric bypass procedures were performed. Of these, 18 were excluded because they did not meet the criteria. A total of 88 patients were included in the study, of which 44 (50%) underwent S-GB and 44 (50%) underwent LBPL-GB (Table 1).

**Table 1: Analysis of basal demographics of both groups.**

Demographics	S-GB (n=44)	LBPL-GB (n=44)	P value
Age (years); mean±SD	3±10.8	40±10	0.718
Female sex; (%)	27 (61.3%)	20 (45.5%)	0.625
Weight (kg); mean±SD	110±20	125±19	0.315
Height (cm); mean±SD	165.8±10	170.7±9.9	0.218
Ideal weight (kg); mean±SD	54.5±0	63.9±9.9	0.068
Excess weight (kg); mean±SD	50.6±12	63.3±17	0.087
BMI (kg/m <sup>2</sup> ); mean±SD	39.8±4	43±5	0.313
T2D; n (%)	5 (11.3%)	9 (20.5%)	0.097
Hypertension; N (%)	11 (25%)	15 (34%)	0.545

S-GB: standard gastric bypass, LBPL-GB: long biliopancreatic limb gastric bypass, SD: standard deviation, BMI: body mass index, T2D: type 2 diabetes mellitus.

Postoperative changes in each group were analyzed at 1 month, 6 months, and 12 months. Only patients with complete data were included in the final analysis, and follow-up included 24 patients (54.5%) in the S-GB group and 26 patients (59%) in the LBPL-GB group.

**Table 2: Weight loss and excess weight loss follow-up.**

	S-GB (n=24)			LBPL-GB (n=64)			P value
	1 month	6 months	12 months	1 month	6 months	12 months	
WL (kg); mean±SD	11.9±5	26.8±8.6	33.1±12.1	13.1±3.9	29.9±7.5	40.2±12.6	0.088
%EWL; mean±SD	25.7±9	53.4±11.4	72.5±14	26.4±12.2	56.5±18.6	72.9±19	0.212

S-GB: standard gastric bypass, LBPL-GB: long biliopancreatic limb, WL: weight loss, EWL: excess weight loss, SD: standard deviation.

The initial BMI of the S-GB group was  $39.8 \pm 4$  kg/m<sup>2</sup> (35-47.7) versus  $43 \pm 5$  kg/m<sup>2</sup> (35.5-53) in the LBPL-GB group. Weight loss, on average, at 12 months was  $33.1 \pm 12.1$  kg (21-60) for the S-GB group and  $40.2 \pm 12.6$  kg (26-65.2) for the LBPL-GB group, with a difference of 7.1 kg (Table 2).

Prior to surgery, 5 (11.3%) patients had a diagnosis of T2D in the S-GB group and 9 (20.5%) in the LBPL-GB group, of whom they were taking, on average, 1 and 1.5 hypoglycemic drugs, respectively. It was found, at 12 months of follow-up, that the complete reduction of medications in diabetic patients in the S-GB group was 80% (4 patients), against 100% (9 patients) in the LBPL-GB group.

In patients with hypertension, the S-GB group used an average of 1.5 drugs and the LBPL-GB group 2 drugs. Of these, 81.8% (9) and 86.6% (13) suspended all drugs, respectively.

Regarding quality of life, the results were evaluated 12 months after the surgical procedure, where patients are grouped as: failure, fair, good, very good and excellent quality of life. Most of the patients in the S-GB group are classified as having very good and excellent quality of life, 11 and 10 respectively, and only 3 were classified as good.

**Table 3: Quality of life results with the BAROS test.**

	S-GB	LBPL-GB
<b>Failure</b>	0	0
<b>Regular</b>	0	0
<b>Good</b>	3 (12.5%)	2 (7.7%)
<b>Very good</b>	11 (45.9%)	8 (30.8%)
<b>Excellent</b>	10 (41.6%)	16 (61.5%)
<b>Total</b>	24 (100%)	26 (100%)

BAROS (bariatric analysis and reporting outcome system).

With similar results in the LBPL-GB group, 8 and 16 patients were classified as very good and excellent quality of life, respectively, and only 2 were classified as good. There were none classified as regular or that had treatment failure (Table 3).

In addition, in the S-GB group, two re-interventions were reported for internal hernia at 12 and 24 months after the main surgery, and in the LBPL-GB group, one re-intervention was reported, also for internal hernia after 12 months. There were treated surgically without complications and the follow-up was uneventful.

## DISCUSSION

In the last 60 years, surgical procedures to treat obesity have been refined and have proven to be the most effective option. Particularly in the last two decades, the Roux-en-Y gastric bypass has been highly effective

against obesity and related comorbidities, due to the favorable metabolic effect obtained. Consequently, because it is safe and feasible, it was established as the gold standard.<sup>9,10</sup>

The length of the biliopancreatic limb has been studied as a variant in the surgical procedure in recent publications, which is precisely what was analyzed in this study. We found a significant difference in weight loss at 12 months of follow-up, being higher in the LBPL-GB group, however, the patients who received this type of surgery were on average more obese. With EWL there really was no significant difference between both surgical procedures. These results demonstrate and confirm that both surgeries have an excellent impact on losing excess weight, specifically in the first year after surgery, where the adaptations to the new gastrointestinal anatomy are more noticeable.<sup>10-13</sup>

The results in the LBPL-GB group regarding the suspension of medications for T2D were significantly better, despite not being so clearly manifested in weight loss or excess weight lost. Similarly, the suspension of medications for hypertension was higher in the LBPL-GB group compared to the S-GB group, which matches with previously published studies.<sup>14-16</sup> Perioperative complications were low with 3 cases in total, with good outcomes and no mortality; similar results are found across the world.<sup>16-18</sup> This procedure is safe but it has to be individualized to have the best results.

Limitations of this study are the number of patients, which is affected by poor adherence to their outpatient follow-up. Clearly, new studies are needed that include a larger number of patients and with a longer follow-up, in order to standardize this procedure and be able to adequately categorize the patients who would benefit most from this surgery, since the information to date is favorable.

## CONCLUSION

In this observational study, the gastric bypass with long biliopancreatic limb shows better results in terms of weight loss and excess weight loss at 12 months of follow-up, when compared with the standard procedure lengths. It has very similar results of reduction of hypoglycemic and hypertension drugs, and it does not increase the risks of perioperative complications. Although there are currently no established guidelines to select those who need LBPL-GB, patients with morbid obesity and comorbidities or even with mild obesity, but with T2D that is difficult to manage or that require multiple medications for their treatment, are suitable candidates.

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## REFERENCES

1. Faria GR. A brief history of bariatric surgery. *Porto Med J.* 2017;2(3):90-2.
2. Zhang Y, Liu J, Yao J, Ji G, Qian L, Wang J, et al. Obesity: pathophysiology and intervention. *Nutrients.* 2014;6:5153-83.
3. Lee WJ, Wang W, Lee YC, Huang MT, Ser KH, Chen JC. Laparoscopic mini-gastric bypass: experience with tailored bypass limb according to body weight. *Obes Surg.* 2008;18:294-9.
4. Rubino F, Gagner M, Gentileschi P, Kini S, Fukuyama S, Feng J, et al. The early effect of the roux-en-y gastric bypass on hormones involved in body weight regulation and glucose metabolism. *Ann Surg.* 2004;240:236-42.
5. Berbiglia L, Zografakis JG, Dan AG. Laparoscopic Roux-en-Y gastric bypass: surgical technique and perioperative care. *Surg Clin.* 2016;96(4):773-94.
6. Ruiz J, Vorwald P, Gonzalez G, Posada M, Salcedo G, Llaveró C, et al. Impact of biliopancreatic limb length (70 cm versus 120 cm), with constant 150 cm alimentary limb, on long-term weight loss, remission of comorbidities and supplementation needs after Roux-En-Y gastric bypass: a prospective randomized clinical trial. *Obes Surg.* 2019;29:2367-72.
7. Murad AJ, Cohen RV, de Godoy EP, Scheibe CL, Campelo GP, Ramos AC, et al. A prospective single-arm trial of modified long biliopancreatic and short alimentary limbs Roux-en-Y gastric bypass in type 2 diabetes patients with mild obesity. *Obes Surg.* 2018;28(3):599-605.
8. Coulman K, Blazeby J. Health-related quality of life in bariatric and metabolic surgery. *Curr Obes Rep.* 2020;9:307-14.
9. McCarty T, Arnold D, Lamont J, Fisher T, Kuhn J. Optimizing outcomes in bariatric surgery. outpatient laparoscopic gastric bypass. *Ann Surg.* 2005;242(4).
10. Guilbert L, Ortiz C, Espinosa O, Sepulveda E, Piña T, Joo P, et al. Metabolic syndrome 2 years after laparoscopic gastric bypass. *Int J Surg.* 2018;52:264-8.
11. Zerrweck C, Herrera A, Sepúlveda EM, Rodríguez FM, Guilbert L. Long versus short biliopancreatic limb in Roux-en-Y gastric bypass: short-term results of a randomized clinical trial. *Surg Obes Rel Dis.* 2021;17(8):1425-30.
12. Nergaard BJ, Leifsson BG, Hedenbro J, Gislason H. Gastric bypass with long alimentary limb or long pancreato-biliary limb- long-term results on weight loss, resolution of co-morbidities and metabolic parameters. *Obes Surg.* 2014;24(10):1595-602.
13. Zorrilla-Nunez LF, Campbell A, Giambartolomei G, Menzo EL, Szomstein S, Rosenthal RJ. The importance of the biliopancreatic limb length in gastric bypass: a systematic review. *Surg Obes Rel Dis.* 2019;15(1):43-9.
14. Christou N, Look D, MacLean L. Weight gain after short- and long-limb gastric bypass in patients followed for longer than 10 years. *Ann Surg.* 2006;244(5).
15. Schauer P, Kashyap S, Wolski K, Brethauer S, Kirwan J, Pothier C, et al. Bariatric surgery versus intensive medical therapy in obese patients with diabetes. *N Engl J Med.* 2012;366:1567-76.
16. Balla A, Batista G, Corradetti S, Belagué C, Fernandez S, Targarona E. Outcomes after bariatric surgery according to large databases: a systematic review. *Langenbecks Arch Surg.* 2017;402:885-99.
17. McTigue K, Wellman R, Nauman E, Anau J, Yates R, Odor A, et al. Comparing the 5-year diabetes outcomes of sleeve gastrectomy and gastric bypass the national patient-centered clinical research network (PCORNet) bariatric study. *JAMA Surg.* 2020;155(5):e200087.
18. Mingrone G, Panunzi S, De Gaetano A, Guidone C, Iaconelli A, Capristo E, et al. Metabolic surgery versus conventional medical therapy in patients with type 2 diabetes: 10-year follow-up of an open-label, single-centre, randomised controlled trial. *Lancet.* 2021;397:293-304.

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