An alternative combined revision of Roux-en-Y gastric bypass: Cover all aspects (of failure)!

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Abstract

The revisional surgical techniques for managing weight regain after laparoscopic Roux-en-Y gastric bypass have lacked a clear gold standard. Various methods such as pouch minimising, gastroenterostomy narrowing and distalization have been described, but none have consistently achieved optimal success. This study introduces a combined revision technique that enables the reassessment of both alimentary limb and biliopancreatic limb lengths based on the individual patient's total bowel length. This approach aims to promote effective weight loss while minimising the pouch and gastroenterostomy.

Keywords: Revision surgery, Roux-en-Y gastric bypass, weight regain

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INTRODUCTION

Bariatric surgery remains the most effective treatment, with effective weight loss and significant improvement in obesity-related comorbidities compared to non-surgical approaches.[1] Laparoscopic Roux-en-Y gastric bypass (LRYGB) is the second-most frequently performed obesity operation worldwide.[2]

Notably, excess weight loss is above 60% in the 5th and 10th years after LRYGB.[1,3] However, 10%–20% of patients reported failing to lose or regain the weight. Nutritional review and psychological evaluation of patients is the first approach to be applied to patients who regain weight after LRYGB. However, a significant number of these patients have anatomical and technical problems that facilitate weight regain. These problems are dilatation of the gastrojejunal anastomosis, enlargement of the gastric pouch, development of gastrogastric fistula, dilatation of the alimentary tract distal to the gastrojejunostomy, inappropriate anastomosis locations and long common channel. These reasons may require revision or conversion.[4] Correction of anatomical factors thought to be responsible for weight regain after LRYGB should form the basis of the preferred surgical method. In the combined revision methods mentioned in the literature, there are techniques where the length of either the alimentary limb (AL) or the biliopancreatic limb (BPL) remains constant while the other is extended, resulting in the shortening of the common limb (CL). The readjustment of both AL and BPL lengths can only be carried out after the removal of the previous AL. In specific cases where patients have undergone LRYGB and subsequently experienced weight regain, there may be a need to consider a surgical approach that involves sacrificing the previous AL. While this may initially seem less favourable, it can serve as a viable strategy

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to achieve the optimal lengths for the AL, BPL and CL. Such adjustments are essential for ensuring effective weight loss in these individuals who have not responded adequately to the initial procedure. In this article, we have described an alternative technique for revising LRYGB that focuses on addressing all the anatomical factors contributing to weight regain.

TECHNIQUE

For intra-abdominal access in the revision procedure, a trocar with a 10 mm diameter was positioned around 12 cm below the xiphoid in the midline, another trocar with a 15 mm diameter was placed on the right midclavicular line at the level of the camera trocar and two trocars with a 5 mm diameter each were inserted on the left midclavicular line and the left anterior axillary line at the same level. Adhesions around the previous surgical sites were carefully dissected. Various measurements were taken, including the total length of the small intestine, the width of the gastroenterostomy and the volume of the gastric pouch. The length of the small intestine was measured with the help of a rope of predetermined length. The newly created gastric pouch was made under 32 Fr tube guidance. The length of the new pouch was determined using one 60 mm stapler on the vertical axis. The new gastroenterostomy was made with a diameter of 3 cm. The lengths of AL and BPL were also measured [Figure 1a]. If necessary, the gastric pouch was minimised [Figure 2]. The alimentary tract, along with the gastroenterostomy, was resected from the proximal part of the enteroenterostomy [Figures 1b, 3 and 4]. The total AL length (TALL) was set at 400 cm, in accordance with current literature.[5] To achieve this, the small intestine was measured 400 cm proximally from the caecum and then transected. A new gastroenterostomy was created between the distal end of the transected small intestine and the new gastric pouch. An enteroenterostomy was performed 150 cm distal from this gastroenterostomy to establish the new AL. As a result, the AL length was 150 cm, the CL length was 250 cm and the remaining intestinal segment was designated as BPL [Figure 1c].

We applied this technique to five patients who had experienced weight regain following LRYGB. The patients had a mean body mass index (BMI) of 42.12 ± 9.9 kg/m^2 before the revision. During the pre-operative examination of these patients, endoscopically dilated gastric pouches and enlarged gastroenterostomies were observed. In addition, potential causes of weight regain, including endocrinologic and psychiatric factors, were ruled out in the pre-operative assessment. After the revision, their mean BMI decreased to 31.65 ± 5.6 kg/m^2. The mean percentage of total weight loss was 26.2% ± 4%. The mean follow-up time was 10.4 ± 6.7 months. None of the patients had any post-operative complications. We conducted 3 monthly follow-up examinations, including blood tests and weight measurements. Importantly, we did not observe any vitamin, mineral or protein deficiencies in the patients, and they did not develop post-operative anaemia. The other details of the patients are given in Table 1.

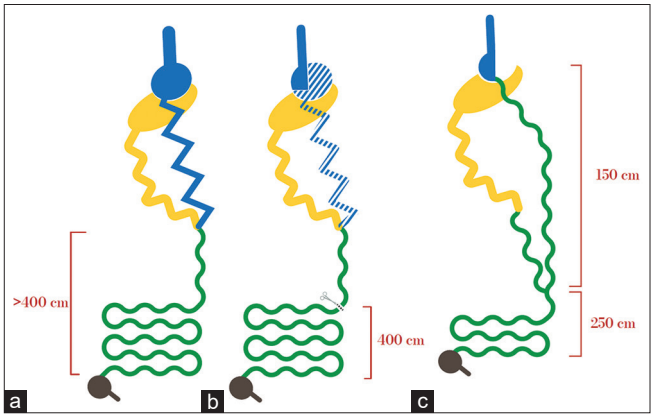

Figure 1: Schematic drawing of the technique. (a) Initial design of LRYGB. Blue: AL. Yellow: BPL. Green: CL. (b) Pouch minimization and resection of the alimentary tract along with the gastroenterostomy. (c) New design after the combined revision

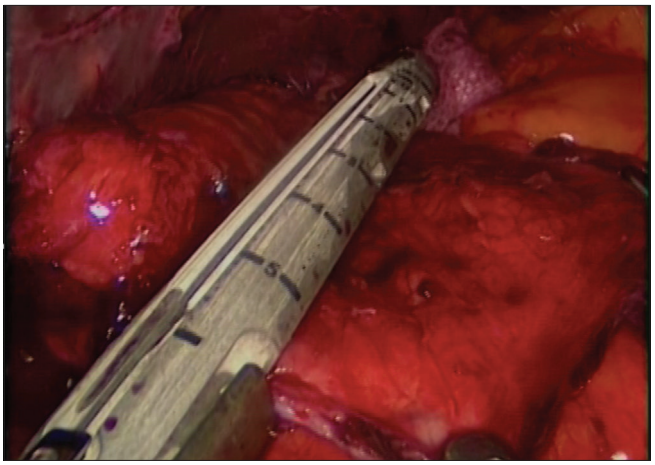

Figure 2: Gastric pouch revision

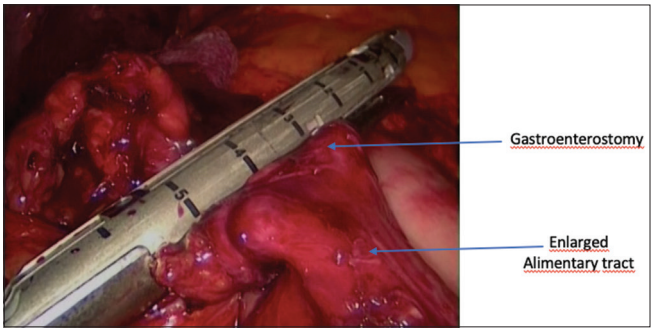

Figure 3: Alimentary tract resection, including gastroenterostomy

Table 1: Weight changes and follow-up of patients

	Mean±SD	Patients				
		1	2	3	4	5
Age	43.6±5.2	37	44	51	45	41
Gender (male/female)	2/3	Male	Female	Male	Female	Female
LRYGB time (year)		2009	2005	2015	2015	2016
Pre-LRYGB weight (kg)	135.6±28.2	178	110	115	150	125
Pre-LRYGB BMI	45.30±8.5	55.5	39	35.1	51.9	45
Minimum weight (kg)	93.00±25	102	56	87	125	95
Minimum BMI	31.06±8.7	31.8	19.8	26.5	43.2	34
Revision time (year)		2020	2021	2021	2021	2022
Pre-revision weight (kg)	126.60±34.3	180	101	110	142	100
Pre-revision BMI	42.12±9.9	56.1	35.7	33.6	49.1	36.1
Current weight (kg)	96.50±18.8	120	78	85	103	75
Current BMI	31.65±5.6	37.4	27.6	26	35.6	26.9
Follow-up time (months)	10.40±6.7	20	11	10	10	6
TWL (%)	26.2±4.1	33	23	23	27	25
EWL (%)	72.8±14.3	60	76	89	56	83
Surgical information						
Total bowel length (cm)	748	900	800	720	640	680
Previous alimentary limb length (cm)	128	150	120	120	100	150
Previous biliopancreatic limb length (cm)	76	80	60	70	100	70

BMI: Body mass index, TWL: Total weight loss, LRYGB: Laparoscopic Roux-en-Y gastric bypass, SD: Standard deviation, EWL: Excess weight loss

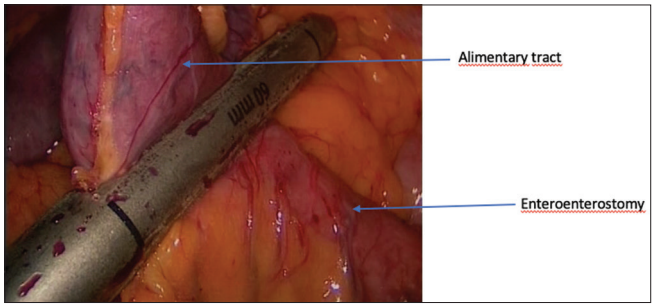

Figure 4: Alimentary tract resection from the proximal part of enteroenterostomy

BENEFITS

Complete resection of the previous AL with gastrojejunostomy is crucial to eliminate the proximal portion of the AL, which can enlarge and function similarly to the stomach. Since the previous gastrojejunostomy is resected with the AL, a new gastrojejunostomy of optimal diameter is also created. In addition, resection of the AL will shorten the total bowel length, thus increasing the hypo-absorptive effect. As emphasised in many distalization methods, it is crucial to ensure that the CL remains longer than 250 cm or the TALL remains longer than 400 cm.[5,6] This is essential to prevent the development of protein–energy malnutrition and complications such as diarrhoea. We believe that the hypo-absorptive effect will be more optimal by keeping the alimentary tract limited to 100–150 cm and extending the BPL.

Patients exhibiting pre-operative and perioperative evidence of gastric pouch and gastroenterostomy dilatation, as well as those for whom the initial surgery's CL length is deemed insufficient for effective hypoabsorption, may be considered suitable candidates for the described technique. Weight regain following LRYGB can present challenges for many surgeons during revision surgeries. This alternative technique stands out because it addresses all anatomical factors contributing to weight gain. This is the study's main strength.

CONCLUSION

The technique we described can be considered an effective and safe method in selected patients for weight regain after LRYGB, thanks to the principles of revising all the anatomical causes.

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Conflicts of interest
There are no conflicts of interest.

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