

Original article

The influence of the percentage of the common limb in weight loss and nutritional alterations after laparoscopic gastric bypass

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Abstract

Background: Roux-en-Y gastric bypass (RYGB) is considered the gold standard for the treatment of morbid obesity. There is no consensus over ideal limb length when the bypass is created and published studies do not take into account the influence of the common limb (CL) on weight loss. The objective was to study the influence of the common limb after RYGB. The setting was the Virgen de la Arrixaca University Clinical Hospital in Murcia, Spain.

Material and Methods: This prospective study includes 151 patients undergoing laparoscopic RYGB surgery for morbid obesity. The patients were divided into 2 groups according to their body mass index. The small intestine (SI) was measured using micro forceps so that the percentage of common limb (%CL) could then be compared against the total SI in each patient. The percentage of excess weight loss (%EWL) in relation to the %CL was calculated at 3, 12, and 24 months. A series of tests was conducted simultaneously to analyze nutritional deficiencies and their relation to the %CL.

Results: The total jejunioleal segment and the %CL in the groups of both obese and super-obese patients had no influence on the %EWL in either group for any of the periods studied. The patients with a %CL < 50% had greater nutritional deficiencies in the follow-up period and required supplements and more frequent laboratory tests.

Conclusions: The %CL has no effect on weight loss in RYGB patients. A lower %CL is related to greater nutritional deficiencies. (Surg Obes Relat Dis 2014;10:829–833.) © 2014 American Society for Metabolic and Bariatric Surgery. All rights reserved.

Keywords:

Roux-en-Y gastric bypass; Common limb; Weight loss; Nutritional deficiencies

Roux-en-Y gastric bypass (RYGB) is considered the gold standard for the surgical treatment of morbid obesity [1,2], yielding a percentage of excess weight loss (%EWL) of 70%–80%. The mechanism through which weight loss occurs is mixed: firstly, it is restrictive because of the creation of a gastric reservoir, and secondly, it is

malabsorptive because part of the small intestine is bypassed and finally changes in hormonal axis also appear to be involved. There is currently no consensus on ideal limb lengths [3]. The studies analyzing weight loss in RYGB patients do not take into account the length of the common limb or total jejunioleal segment, nor do they consider the percentage of intestine representing the common limb in relation to the whole of the small intestine, which means we do not know its influence on weight loss.

The main objective of our study is to assess the %EWL in relation to the length of the total small intestine and

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percentage of the common limb (%CL) in patients undergoing RYGB, together with the influence of the %CL in these patients on nutritional deficiencies.

Methods

A prospective observational study was conducted in 151 patients with morbid obesity undergoing laparoscopic RYGB between January 2007 and January 2010. The patients were divided into 2 groups according to their body mass index (BMI): (1) morbid obese patients (BMI 35–50 kg/m²) with 115 patients; and (2) morbid super-obese patients (BMI > 50 kg/m²) with 36 patients. The exclusion criteria were: alterations in the gastrointestinal tract due to previous surgery; technical impossibility of measuring the intestine; and appearance during follow-up of diseases or conditions that might affect weight loss (tumors, pregnancy, etc.).

All of the patients were operated on by the same team of surgeons. RYGB was performed via the laparoscopic approach with creation of a gastric reservoir from the 1st–2nd coronary vessel to the angle of His, placement of a 32French tube, and a manual antecolic gastrojejunal anastomosis.

Measurement of the intestine was done using micro forceps with millimeter markings at 5 and 10 cm. Measurements were always taken twice for greater reliability and if they did not agree, a third measurement was taken. The length of the biliopancreatic limb was 100 cm in both groups; the alimentary limb was 150 cm in the obese group of patients and 200 cm in the super-obese group.

All of the patients had their intestine measured from the angle of Treitz to the ileocaecal junction, and the common limb was calculated by subtracting the alimentary limb and biliopancreatic limb from the total jejunioileal segment (TJS). We then calculated from the total TJS the percentage of intestine corresponding to the common limb (%CL) to assess whether there was an optimum percentage of common limb in relation to the TJS that conditioned greater weight losses in these patients.

The %EWL was quantified in both groups at 3, 12, and 24 months with laboratory tests conducted in the same periods to analyze ferritin; iron; hemoglobin; zinc; vitamins E, C, A, D3, B1, and B12; folic acid, total proteins; albumin; and calcium. A standardized supplementation regime (Multicentrum®, Whitehall, Santiago de Chile) was prescribed to all of the patients, with individual adjustments depending on the actual results of the nutritional blood measurements. A standard supplementation therapy regimen included a daily pill consisting of beta carotene; vitamins A, E, C, B1, B2, B6, B12, and D; folic acid; calcium; phosphorus; iodine; iron; magnesium; manganese; potassium; chlorine; zinc; and nickel.

Regardless of BMI, it was analyzed whether the percentage of intestine used in creating the common limb (%CL) had any influence on nutrient deficiencies. For this analysis

Table 1
Demographic data

	Obese group (n = 115)	Super-obese group (n = 36)
Sex		
Male	36 (31.3%)	14 (38.9%)
Female	79 (68.7)	22 (61.1%)
Age	40.6 ± 10.9 (20–65)	38.4 ± 12.3 (18–63)
BMI	42.2 ± 4.1 (35–49)	55 ± 6 (50–72)

BMI = body mass index.

the patients were divided into 2 groups: group 1 (n = 47), those with a %CL ≤ 50%; and group 2, those with a %CL > 50% (n = 104).

Data were analyzed using the SPSS 17.0 statistical software package. The comparison of means between the different variables was done using the Student t test. A linear regression test was used to correlate the %EWL in relation to the common limb and total jejunioileal segment. The confidence interval was 95% for a P value of <0.05.

Results

There was a 100% patient follow-up at 2 years. The demographic data of both groups of patients are shown in Table 1.

No statistically significant differences were found for length of the TJS between the morbid obese patients and the super-obese patients, which was 567 cm [335–860] in the former group and 591 cm [475–780] in the latter.

When analyzing the %EWL between the group of obese and super-obese patients, we found no statistically significant differences for any of the periods (Table 2).

When analyzing the %EWL in relation to length of the total jejunioileal segment, we found no significant differences in 2 of the periods studied (12 mo: R squared = 0.011; 24 mo: R squared = 0.005) in either group (obese and super-obese patients), and therefore total small bowel length had no effect on the %EWL.

The percentage of intestine corresponding to the common limb (%CL) was 53.9% ± 6.8 [25%–65%] in the group of patients with a BMI < 50 kg/m² and 49.6% ± 6.7% [36%–61%] in the group of super-obese patients. No significant differences in %CL were found in either group (obese and super-obese patients).

Table 2
Comparison of the percentage of excess weight loss according to body mass index

Follow-up	Obese group (%EWL)	Super-obese group (%EWL)	P value
3 mo	39 ± 16.2	38.7 ± 13.7	ns
12 mo	71.4 ± 14.9	65.7 ± 15.3	ns
24 mo	78.2 ± 16.5	72.2 ± 15.9	ns

%EWL = percentage of excess weight loss; ns = not significant.

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