

Original article

# Twelve-year results for revisional gastric bypass after failed restrictive surgery in 131 patients

David Edholm, M.D.<sup>a,\*</sup>, Ingmar Näslund, M.D., Ph.D.<sup>b</sup>, F. Anders Karlsson, M.D., Ph.D.<sup>c</sup>,  
Eva Rask, M.D., Ph.D.<sup>d</sup>, Magnus Sundbom, M.D., Ph.D.<sup>a</sup>

<sup>a</sup>Department of Surgical Sciences, Uppsala University, Uppsala, Sweden

<sup>b</sup>Department of Surgical Sciences, Örebro County Council, School of Health and Medical Sciences, Örebro University, Örebro, Sweden

<sup>c</sup>Department of Medical Sciences, Uppsala University, Uppsala, Sweden

<sup>d</sup>Centre for Health Care Sciences, Örebro County Council, School of Health and Medical Sciences, Örebro University, Örebro, Sweden

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## Abstract

**Background:** Gastric banding (GB) and vertical banded gastroplasty (VBG) may result in unsatisfactory weight loss or intolerable side effects. Such outcomes are potential indications for additional bariatric surgery, and Roux-en-Y gastric bypass is frequently used at such revisions (rRYGB). The present study examined long-term results of rRYGB.

**Methods:** In total, 175 patients who had undergone rRYGB between 1993 and 2003 at 2 university hospitals received a questionnaire regarding their current status. The questionnaire was returned by 131 patients (75% follow-up rate, 66 VBG and 65 GB patients). Blood samples were obtained and medical charts studied. The reason for conversion was mainly unsatisfactory weight loss among the VBG patients and intolerable side effects among GB patients.

**Results:** The 131 patients (112 women), mean age 41.8 years at rRYGB, were evaluated at mean 11.9 years (range 7–17) after rRYGB. Mean body mass index of those with prior unsatisfactory weight loss was reduced from 40.1 kg/m<sup>2</sup> (range 28.7–52.2) to 32.6 kg/m<sup>2</sup> (range 19.1–50.2) ( $P < .01$ ). Only 2 patients (2%) underwent additional bariatric surgery after rRYGB. The overall result was satisfactory for 74% of the patients. Only 21% of the patients adhered to the recommendation of lifelong multivitamin supplements while 76% took vitamin B<sub>12</sub>. Anemia was present in 18%.

**Conclusions:** rRYGB results in sustained weight loss and satisfied patients when VBG or GB have failed. Subsequent bariatric surgery was rare but micronutrient deficiencies were frequent. (Surg Obes Relat Dis 2014;10:44–48.) © 2014 American Society for Metabolic and Bariatric Surgery. All rights reserved.

## Keywords:

Revisional gastric bypass; Gastric bypass; Weight loss; Morbid obesity; Gastric banding; Vertical banded gastroplasty

In the past decade, bariatric surgery has increased worldwide [1] and restrictive bariatric surgery such as gastric banding (GB) results in significant weight loss [2]. However, late weight regain and other complications such as band erosion are common and may require revisional surgery [3]. Vertical banded gastroplasty (VBG), another

restrictive procedure, produces similar weight loss but may result in late weight regain due to staple line disruption [4]. These methods have led to a demand among a fraction of previously operated patients for repeated bariatric surgery. Failed restrictive procedures have been successfully converted by revisional Roux-en-Y gastric bypass (rRYGB) [5] with encouraging results maintained at 5–7 years [6,7]. However, extended long-term results have been requested [8].

The purpose of this study was to evaluate long-term results of rRYGB, with emphasis on weight, need for

\*Correspondence: David Edholm, M.D., Department of Surgical Sciences, Uppsala University, Uppsala SE-751 85, Sweden.

E-mail: dedholm@gmail.com

subsequent surgery, attendance to checkups, and supplementation and patient satisfaction and to compare data after rRYGB to our previously published results after primary Roux-en-Y gastric bypass (RYGB) [9].

## Methods

In this long-term follow-up, all living patients who had undergone rRYGB at one of 2 tertiary referral centers from 1993 to 2003 were invited to participate. They received a standardized questionnaire [9] and, when necessary, a phone call reminder as well as a second questionnaire. From rRYGB to start of study, 17 patients died, mean  $6.2 \pm 3.9$  years after rRYGB, from causes unrelated to rRYGB.

All patients had initiated the process for the second procedure themselves (i.e., no patient was recruited from a registry; some patients were referred to us for revisional surgery from other regions, although the majority were listed at our hospitals. Patients were evaluated by a bariatric surgeon, an internist, and a dietician. Preoperative upper endoscopy or radiographic tests were performed when suitable. All procedures were performed openly by a senior bariatric surgeon. At surgery, a 70-cm long Roux limb was anastomosed to a completely divided small gastric pouch, as described earlier [6]; that is, a gastric bypass ad modum Roux-en-Y was performed in all patients. The biliary limb was 30 cm. In general, no gastrostomies or drains were placed. Patients were followed at the outpatient clinic for as long as considered necessary, most often 2 years, and then referred to primary care. Life-long supplements of multivitamins and vitamin B<sub>12</sub> were recommended, as well as annual checkups at a primary healthcare clinic.

The charts of all patients were evaluated, and prior bariatric surgery, preoperative weight, prevalence of treatment-demanding co-morbidities, and medication at admission were recorded. The main reason for revisional surgery was noted as unsatisfactory weight loss or intolerable side-effects after prior bariatric surgery. Information regarding subsequent surgery, present weight, and medication was collected from the questionnaire and compared with medical charts. Frequency of dysphagia, vomiting, abdominal pain, dumping, and diarrhea was rated by the patients on an ordinal scale (daily, weekly, monthly, yearly, or never). Use of supplements and attendance to check-ups were studied. Patients were asked to state their degree of overall satisfaction with surgery on an ordinal scale and if they would recommend RYGB to a friend.

## Statistical methods

All numerical data are expressed as mean with standard deviation unless otherwise stated. Continuous data were compared using Student's *t* test. Proportions were compared using  $\chi^2$  test or Fisher exact test. Ordinal data were

compared using Mann-Whitney test. A  $P < .05$  was considered significant. In the analysis, excess body mass index (BMI) was defined as weight exceeding that of BMI 25 kg/m<sup>2</sup>. The study was approved by the Regional Ethical Review Board, and a written consent from all patients was acquired.

## Results

The questionnaire was returned by 131 patients (85% females), resulting in a follow-up rate of 75%, with a mean age of 41.8 years  $\pm$  9.2 at rRYGB. Mean follow-up time was 11.9 years (range 7–17 yr). Patient characteristics are shown in Table 1. Five patients had undergone 2 prior bariatric procedures, the last surgery determined in which group they were included. Most primary procedures had been performed through laparotomy. The mean interval between primary and revisional surgery was 5.9 years (range 3 mo to 17 yr). At rRYGB, most patients in the unsatisfactory weight loss group were VBG patients with staple line rupture. On the other hand, most patients in the intolerable side effects group had undergone a gastric banding procedure. Three patients with intolerable side effects had a normal BMI (18.5–25 kg/m<sup>2</sup>) at rRYGB, at follow-up BMI remained normal. No patient was underweight (BMI < 18.5 kg/m<sup>2</sup>) at rRYGB.

At follow-up, mean BMI was reduced from  $37.8 \pm 6.2$  kg/m<sup>2</sup> to  $32.0 \pm 6.4$  kg/m<sup>2</sup> ( $P < .0001$ ). Unsatisfactory weight loss after primary surgery was the cause for revisional surgery in 60% ( $n = 79$ ). In this group, mean BMI decreased from 40.1 kg/m<sup>2</sup> to 32.6 kg/m<sup>2</sup> ( $P < .0001$ ) achieving a median excess BMI loss (EBMIL) of 54%. No correlation was seen between EBMIL and follow-up time.

Table 1  
Patient characteristics

Prior procedure	Vertical banded gastroplasty	Gastric banding
Number of patients	66	65
Gender (F/M)	59/7	53/12
Age median (yr) Range	42 (26–60)	41 (23–60)
Weight median (kg) Range	107 (60–171)	102 (58–200)
BMI median (kg/m <sup>2</sup> ) Range	39.2 (25–52)	36.1 (23–54)
Indication for revision		
Unsatisfactory weight loss	77%	43%
Intolerable side effects	23%	57%
Mean interval from primary surgery to rRYGB (yr)	7	5
At follow-up		
Weight median (kg) Range	89 (60–134)	89.5 (52–170)
BMI median (kg/m <sup>2</sup> ) Range	31.8 (22–47)	31.7 (19–50)
EBMIL% median	49%	39%
Proportion recommending rRYGB	93%	89%

BMI = body mass index; EBMIL = excess body mass index loss; rRYGB = revisional Roux-en-Y gastric bypass.

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