Laparoscopic Roux-en-Y Gastric Bypass Surgery in the Obesity Center Wuerzburg – Patient Selection and Results

Martin Fein^a Marco Bueter^{a,b} Christian Jurowich^a Alexander Wierlemann^a
Annette Gerlach^a Andreas Thalheimer^a

^a Department of Surgery, University of Wuerzburg Hospital, Germany

^b Department of Investigative Medicine, Hammersmith Hospital, Imperial College London, United Kingdom

Key Words

Bariatric surgery · Gastric bypass · Gastric banding · Procedure selection

Summary

Background: The choice between different bariatric procedures for each patient is an important question in bariatric surgery. In this article, we explain criteria for patient selection for laparoscopic Roux-en-Y gastric bypass at the Obesity Center Wuerzburg and compare the corresponding outcomes for these selection criteria. **Methods:** 60 consecutive patients underwent gastric bypass surgery (34 female, 26 male; mean age 45.1 ± 10.2 years). Mean preoperative BMI was 53.7 ± 8.7 kg/m². Selection criteria were age >40, male sex, BMI > 50, metabolic syndrome, and/or reduced compliance. **Results:** 42 patients (70%) were >40 years old, 26 patients (43%) were male, 42 patients (70%) had a BMI > 50, and 28 patients had a metabolic syndrome (47%). 10 out of these 60 patients were reoperated after failed gastric banding. Overall weight loss was 43.7 ± 18.7 kg, BMI loss was 15.0 ± 6.4 kg/m², and excess body weight loss (EBWL) was $54.3 \pm 19.7\%$. There were 34 patients with an EBWL of $\geq 50\%$. Age, sex, and presence or absence of metabolic syndrome were irrelevant for postoperative weight loss. Although the EBWL was slightly higher in patients with a BMI < 50, patients with a BMI > 50 lost significantly more weight. **Discussion:** The indication for a gastric bypass may be substantiated by the higher weight reduction in patients with a BMI > 50. Other selection criteria had no influence on the postoperative outcome.

Introduction

Several surgical approaches to obtain weight loss have been described. These are categorized as either restrictive (i.e. gastric banding or sleeve resection) or malabsorptive (i.e. biliopancreatic diversion $\pm$ duodenal switch), or a combination of restrictive and malabsorptive (i.e. Roux-en-Y gastric bypass) [1]. A very important question in bariatric surgery is which procedure should be selected for which patient. So far, definite criteria for procedure selection could not be derived from the results of randomized studies comparing 2 different procedures [2]. Consequently, the surgical approach is usually selected based on personal experience and the patient's request.

At the Obesity Center Wuerzburg, bariatric surgery was started exclusively with gastric banding in 1997. Sleeve resection has been offered as an alternative since 2002. Laparoscopic Roux-en-Y gastric bypass (LRYGB) surgery was started in 2006 due to an increasing number of reoperations and band failures. Patient selection was based on literature data and the results of gastric banding at the Obesity Center Wuerzburg.

In this study, these criteria for patient selection for LRYGB are explained and the corresponding outcomes after LRYGB compared.

Patients and Methods

Between January 2006 and July 2008, 60 consecutive patients underwent gastric bypass surgery at the Obesity Center Wuerzburg. There were 34 women and 26 men with a mean age of 45.1 ± 10.2 years. The mean preoperative weight was 155 ± 27 kg and the mean BMI was 53.7 ± 8.7 kg/m². Each patient was consulted by a multidisciplinary team and evaluated by a psychologist, an endocrinologist, and a surgeon. Selection criteria for LRYGB were age >40, male sex, a BMI > 50, metabolic syndrome, and/or reduced compliance. Patients with a BMI > 60 were scheduled for a gastric balloon for 6 months before LRYGB to reduce body weight prior to surgery and decrease the operative risk.

Surgical Procedure

Pneumoperitoneum was established via a Veres needle insertion above the umbilicus or in the left upper quadrant. Five trocars were then inserted: a 10 mm optical trocar 25 cm below the xiphoid, three 5/12 mm operating trocars (right and left upper quadrant and left lateral), and a 10 mm trocar right lateral for the liver retractor. The harmonic scalpel (Ethicon Endo-Surgery; Norderstedt, Germany) was used to facilitate a division of the gastrohepatic omentum, to divide and seal blood vessels, and to create gastrotomy and enterotomy sites. A 6–7 cm long, vertically oriented gastric pouch (size 15–20 ml) was created with sequential firings of the Echelon EndoGIA 60 mm blue cartridge (Ethicon Endo-Surgery). The antecolic, antegastric gastrojejunostomy was performed 50 cm distal to the ligament of Treitz after the division of the jejunum with a 60 mm white cartridge. The alimentary loop was connected to the pouch with a 2-0 Polysorb suture (Covidien; Neustadt/D., Germany). Half of a 60 mm blue cartridge was inserted into the pouch and the jejunum in a side-to-side fashion. The end of the gastrojejunostomy was closed with a continuous 2-0 Polysorb suture and tested with methylene blue. The Roux jejunal limb was 120 cm in length (150 cm in patients with an initial BMI > 60). The distal jejunostomy was created by side-to-side stapling with an Echelon 60 mm white cartridge and closed with a continuous 2-0 Polysorb suture. Finally, the Peterson space was closed with a 2-0 Ethisorb suture (Ethicon Endo-Surgery). The technique is similar to the one described by Weiner et al. [3] and Schaeffer et al. [4].

Statistical Analysis

Data are presented as mean $\pm$ standard deviation. Comparisons were made with the Fisher exact test or the Mann-Whitney U test. Data were analyzed with SAS software (SAS Institute; Cary, NC, USA). P-values < 0.05 were considered to be significant.

Results

Patients scheduled for LRYGB fulfilled selection criteria as follows: 42 patients (70%) were >40 years old, 26 patients (43%) were male, 42 patients (70%) had a BMI > 50, and 28 patients (47%) had a metabolic syndrome. 10 patients were reoperated after failed gastric banding. They experienced band erosion ($n = 3$), severe esophageal dilatation ($n = 1$), or insufficient weight loss ($n = 6$). Reduced compliance is difficult to measure and was therefore not evaluated. Only 2 women fulfilled none of the selection criteria, they were very confident, though, that a LRYGB would be the best procedure for them.

Because of previous major bowel surgery or a large abdominal hernia, 6 patients underwent open surgery. There were another 6 conversions in the first 35 patients. If the gastrojejunostomy was done by laparotomy, a 25 mm circular stapling device was used. Postoperative complications included 4 anastomotic leaks at the gastrojejunostomy (6.7%). All of these patients were reoperated. One of these patients died (1.7%). One other patient had a reoperation because of persistent bleeding from the gastrojejunostomy with a circular anastomosis.

Follow-Up

All patients were seen 6 weeks, 3, 6, and 12 months after surgery and then every 6 months. The evaluated data on weight loss included the final weight on any of these follow-up investigations. Overall weight loss was 43.7 ± 18.7 kg, BMI loss was 15.0 ± 6.4 kg/m², and excess body weight loss (EBWL) was $54.3 \pm 19.7\%$. The standard definition of EBWL with a BMI > 25 was applied. There

Table 1. Effect of age on weight loss

	< 40 years, n = 18	≥ 40 years, n ≥ 42	p
Mean weight loss, kg	44.2 ± 17.4	43.4 ± 19.4	0.499
Mean BMI loss, kg/m ²	15.6 ± 5.9	14.7 ± 6.6	0.315
Mean EBWL, %	54.1 ± 21.0	54.3 ± 19.5	0.817
% patients with EBWL > 50%	60	56	1.0

Table 2. Effect of sex on weight loss

	Male, n = 26	Female, n = 34	p
Mean weight loss, kg	45.8 ± 16.8	41.8 ± 20.3	0.327
Mean BMI loss, kg/m ²	14.4 ± 5.0	15.4 ± 7.4	0.822
Mean EBWL, %	57.1 ± 19.4	51.8 ± 20.1	0.555
% patients with EBWL > 50%	64	52	0.417

Table 3. Effect of metabolic syndrome on weight loss

	Metabolic syndrome		p
	no, n = 28	yes, n = 32	
Mean Weight loss, kg	44.6 ± 19.1	42.9 ± 18.9	0.604
Mean BMI loss, kg/m ²	15.5 ± 6.3	14.5 ± 6.5	0.358
Mean EBWL, %	55.1 ± 19.2	53.5 ± 21.1	0.448
% patients with EBWL > 50%	50	66	0.278

Table 4. Effect of BMI on weight loss

	BMI < 50, n = 18	BMI ≥ 50 , n = 42	p
Mean Weight loss, kg	33.7 ± 12.9	50.5 ± 19.2	0.001
Mean BMI loss, kg/m ²	11.1 ± 4.2	17.6 ± 6.2	0.001
Mean EBWL, %	58.6 ± 24.8	51.3 ± 15.1	0.303
% patients with EBWL > 50%	55	59	0.784

were 34 patients with an EBWL $\geq 50\%$. The reduction of comorbidities was significant, e.g. the condition of diabetes was improved in 86% of the diabetic patients.

To evaluate the relevance of the selection criteria applied for the corresponding outcome, weight loss was compared between patients who did or did not fulfill these criteria. There was no difference in weight loss between patients under or over 40 years of age (table 1), between male or female patients (table 2), and between patients with or without metabolic syndrome (table 3). Although the EBWL was slightly higher in patients with a BMI < 50, patients with a BMI > 50 lost significantly more weight (table 4).

Discussion

At the Obesity Center Wuerzburg, we started to perform LRYGB surgery in 2006 due to the number of reoperations and band failures after gastric banding [5]. 97% of the operated patients fulfilled the criteria regarding age, sex, BMI, and presence or absence of metabolic syndrome. Yet, those criteria were irrelevant for postoperative weight loss. Although the EBWL was slightly higher in patients with a BMI < 50, patients with a BMI > 50 lost significantly more weight. In accordance to the literature, the diabetic condition was improved in 86% of patients with impaired glucose homeostasis prior to surgery [6].

In a recent systematic review which compared the 2 most popular bariatric procedures, i.e. gastric banding and bypass, weight loss outcomes strongly favored Roux-en-Y gastric bypass over laparoscopic adjustable gastric banding (LAGB) [7]. In contrast, Dixon et al. [8] have shown a similar weight loss for both procedures. Our recommendation for gastric bypass in patients with a higher BMI is in accordance to the results of Buchwald's systematic review [9]. Patients treated with gastric banding had a lower short-term morbidity than those treated with gastric bypass, but reoperation rates were higher among gastric banding patients [7]. The lower short-term morbidity may serve as an argument for choosing gastric banding for younger patients.

Female sex and a BMI < 50 kg/m² have been identified to predict success of gastric banding [10], which is in accordance to previous reports [11, 12]. However, the resolution of diabetes was poorer after LAGB (59%) than after LRYGB (86%) [5].

In general, there are still no official guidelines how to choose the appropriate bariatric surgery. In a comprehensive review of the procedures and outcomes in bariatric surgery published in *Gastroenterology*, no recommendation was made [1]. The Consensus Statement on bariatric surgery for morbid obesity [2] states on page 596: 'Certain surgeons perform one operation exclusively; other surgeons offer the full range of operations. There is an increasing effort to match a particular patient to a particular operation. To this end, several selection approaches or algorithms have been suggested; randomized trials that test these algorithms have not been conducted.'

Meanwhile, a randomized controlled trial was conducted which compares gastric banding with sleeve gastrectomy in 80 patients [13]. Weight loss and reduction of hunger feelings after 1 and 3 years were better after sleeve gastrectomy than after gastric banding. The number of reoperations was significant in both groups, but the severity of complications appeared to be higher in sleeve gastrectomy. In a small randomized trial (n = 32 patients)

which compared gastric bypass with sleeve gastrectomy, appetite reduction and excess weight loss were greater after sleeve gastrectomy than after gastric bypass in the first year [14]. Both studies may promote the indication for sleeve gastrectomy. However, long-term success of this procedure only seems to be realistic for about 60% of the operated patients [15, 16]. At the Obesity Center Wuerzburg, sleeve gastrectomy has so far been chosen for patients with an extremely high operative risk or as an alternative for patients with sufficient weight loss after gastric banding and subsequent band erosion. Therefore, the selection criteria for sleeve gastrectomy in comparison to gastric banding or bypass cannot be evaluated in these patients.

Conclusions

As female sex and BMI < 50 kg/m² can predict success of gastric banding, we consider gastric banding as the first choice in patients that fulfill these criteria. In contrast, LRYGB is recommended to male patients with a BMI > 50 kg/m². If diabetes type II is present, LRYGB should be advised independent of age, sex, or BMI. As long as long-term data are missing, sleeve gastrectomy is performed only in single cases at the Obesity Center Wuerzburg. However, the risks of morbidity and the differences in weight reduction have to be balanced and should be discussed with each patient individually.

Disclosure

The corresponding author declares that none of the authors has any connections whatsoever with the companies whose products are named in this paper or with any company in competition with those companies. The presentation of the topic is impartial and the contents are entirely product neutral.

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