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Midterm outcomes of one anastomosis gastric bypass versus Roux-en-y gastric bypass: Single center experience

Servet Karagül,[1] Serdar Şenol,[1] Oktay Karaköse,[2] Hüseyin Eken[3]

[1]Department of Gastroenterological Surgery, Samsun Training and Research Hospital, Samsun, Türkiye
[2]Department of Surgical Oncology, Samsun Training and Research Hospital, Samsun, Türkiye
[3]Private Clinic of General Surgery, Izmir, Türkiye

ABSTRACT

Introduction: One anastomosis gastric bypass (OAGB) and Roux-en-Y gastric bypass (RYGB) are successful surgical treatment options for morbid obesity. In this study, we aimed to share our results by comparing these two bypass techniques in a retrospective analysis.

Materials and Methods: A retrospective study was conducted at a single center at Samsun Training and Research Hospital. The outcomes of two groups, laparoscopic OAGB and laparoscopic RYGB, were compared. Patients with a BMI over 40 kg/m² and patients with a BMI over 35 kg/m² with obesity-related comorbidities were included. Patient demographics, obesity-related comorbidities, medications, postoperative outcomes, percentage excess weight loss (%EWL), percentage total weight loss (%TWL), and postoperative BMI were recorded retrospectively.

Results: A total of 64 patients were retrospectively analyzed. Fifty-one of the patients were female, and thirteen were male. There were 21 patients in the OAGB group and 43 patients in the RYGB group. The mean follow-up period was 42.86±3.54 months in the OAGB group and 52.21±11.58 months in the RYGB group ($p<0.05$).

The mean %TWL was 35.43±5.26 in the OAGB group and 34.70±11.31 in the RYGB group ($p>0.05$). The mean %EWL was 83.02±18.95 and 76.08±22.84, respectively ($p>0.05$). The mean BMI was 29.62±5.42 kg/m² in the OAGB group and 30.14±5.05 kg/m² in the RYGB group ($p>0.05$).

There was no significant difference in the improvement of obesity-related comorbidities. However, de novo reflux was significantly higher in OAGB patients.

Conclusion: OAGB and RYGB are both effective procedures for treating morbid obesity. Both procedures provide similar improvements in obesity-related diseases, although de novo reflux appears to be more common in OAGB patients.

Keywords: Morbid obesity, one anastomosis gastric bypass, Roux-n-Y gastric bypass

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Correspondence: Servet Karagül, M.D., Department of Gastroenterological Surgery, Samsun Training and Research Hospital, Samsun, Türkiye
e-mail: servetkaragul@hotmail.com

Introduction

Obesity has become one of the most serious public health challenges of our time. It is known to be a cause of certain cancers and is associated with numerous other problems, such as type 2 diabetes, hypertension, sleep apnea, and coronary heart disease.[1-6] In 2016, more than 1.9 billion adults aged 18 years and older were overweight, and more than 650 million adults were obese. The global prevalence of obesity nearly tripled between 1975 and 2016.[7] Unfortunately, the food industry, lifestyle changes, and environmental conditions negatively impact people, causing them to gain excess weight.[8-15]

Diet and physical activity are typically the starting points in treating obesity. However, the rate of permanent weight loss in morbidly obese patients using these treatment options is very low because patients struggle to adhere to diet and exercise programs for extended periods. There are currently no medical treatments with long-term success. Today, the most effective treatment for morbid obesity is surgery. One anastomosis gastric bypass (OAGB) and Roux-en-Y gastric bypass (RYGB) are successful surgical options for the treatment of morbid obesity.[16-27]

Roux-en-Y gastric bypass (RYGB) has been used safely in bariatric surgery for many years with successful long-term outcomes. One anastomosis gastric bypass (OAGB) is a restrictive and malabsorptive procedure like RYGB, first reported by Rutledge in 2001.[23] Since no enteroenterostomy is performed, the procedure is completed with a single anastomosis between the stomach and small intestine. The absence of a second anastomosis was expected to reduce morbidity by preventing surgical complications, such as internal herniation, anastomotic leakage, and bleeding. Both procedures are effective in treating obesity-related conditions. This study aimed to share our results by comparing these two bypass techniques in a retrospective analysis.

Materials and Methods

This retrospective study was conducted between January 2016 and December 2020 at a single center, Samsun Training and Research Hospital. The study was approved by the Ethics Committee at the Ethics Committee of Samsun University Hospital (no GOKAEK 2024/5/11). The outcomes of two groups, laparoscopic OAGB and laparoscopic RYGB, were compared. Patients with a body mass index (BMI) over 40 kg/m² and those with a BMI over 35 kg/m² with obesity-related comorbidities were included. Morbidly obese patients aged 18 to 65 years were eligible for the study. Patients who underwent a revision of any gastric bypass procedures, were lost to follow-up, or could not be contacted to obtain current data were excluded from the study.

All patients underwent preoperative endoscopy. RYGB was preferred by surgeons for patients with gastroesophageal reflux, hiatal hernia, or esophagitis. After surgery, patients were given a clear liquid diet. They remained on a liquid diet for two weeks, followed by pureed food for four weeks. After this period, patients were gradually reintroduced to a normal diet, provided they chewed thoroughly. Multivitamins were given postoperatively, and physical activity was planned by a sports specialist. To prevent muscle atrophy, patients began aerobic exercise two weeks after surgery and resistance exercise two months later.

Demographic characteristics, including age, sex, and BMI, were recorded. Obesity-related comorbidities and medications were recorded retrospectively. Patients were called in for clinic assessment. Type 2 diabetes remission was defined as HbA1c below 6% and normal fasting glucose without medication. Sleep apnea remission was defined as no longer needing continuous positive airway pressure (CPAP), and asthma and hypertension remission was defined as no longer requiring drug therapy. Updated information was obtained by telephone for patients unable to attend follow-up appointments.

Statistical Methods

Scaled values were described using means and standard deviations, while nominal and ordinal parameters were described using frequency analysis. The Kolmogorov-Smirnov test was used to assess the normality of the scaled parameters. The independent samples t-test was used to compare normally distributed values, while the Mann-Whitney U test was used for non-normally distributed parameters. Fisher's exact test was used to compare categorical variables. A 95% confidence interval and a significance level of 0.05 were used. SPSS 25.0 for Windows was employed to assess the research parameters.

Surgical Techniques

In RYGB, a gastric pouch was created using an endoscopic stapler with a volume of 30–40 ml. A 35 mm antecolic anastomosis was performed between the bowel loop, 50 cm from the ligament of Treitz, and the newly created gas-

tric pouch using a linear stapler. The biliopancreatic limb was transected just proximal to the gastroenterostomy and anastomosed to 150 cm of the alimentary limb. The stapler orifice was closed with polypropylene running sutures, and the mesenteric defect was closed with non-absorbable sutures.

In OAGB, dissection was performed along the lesser curvature below the crow's foot to enter the lesser sac. The gastric pouch was created using endoscopic staplers guided by a 36F gastric calibration tube. An anastomosis was created between the jejunum, 200 cm from the ligament of Treitz, and the new gastric pouch. The stapler orifices were closed with polypropylene running sutures.

Results

A total of 64 patients were analyzed retrospectively. Fifty-one of the patients were women, and thirteen were men. There were 21 patients in the OAGB group and 43 in the RYGB group. No significant differences were observed between the groups in terms of age, gender, or BMI. The groups were similar in terms of obesity-related diseases (Table 1).

The mean follow-up was 42.86±3.54 months in the OAGB group and 52.21±11.58 months in the RYGB group, showing a significant difference. The mean percentage total weight loss (%TWL) was 35.43±5.26 in the OAGB group and 34.70±11.31 in the RYGB group, with no significant difference between the groups. The mean percentage excess weight loss (%EWL) was 83.02±18.95 and 76.08±22.84, respectively, and was similar between the groups. At the end of follow-up, the mean BMI was 29.62±5.42 kg/m² in the OAGB group and 30.14±5.05 kg/m² in the RYGB group, with no significant difference. There was also no difference in the improvement of obesity-related comorbidities, such as asthma, diabetes mellitus, hypertension, and obstructive sleep apnea, between the groups. Postoperatively, B12 deficiency, vitamin D deficiency, and iron deficiency were observed at similar rates in both groups. However, de novo reflux was significantly higher in OAGB patients (Table 2).

Discussion

Although many treatment options exist for obesity, surgery remains the most effective. Currently, there is ongoing research into endoscopic procedures and medical treatments. While these options have not yet shown consistent success, they may supplement surgical treatment in the future. OAGB and RYGB are two well-established surgical options with high success rates. RYGB has been safely performed for decades and is one of the most widely accepted procedures worldwide. Although OAGB is a newer procedure, it is considered a successful and safe method with long-term results.

In our study, RYGB patients had a longer follow-up period (42.86±3.54 months in the OAGB group and 52.21±11.58 months in the RYGB group). This difference is attributed to

Table 1. Baseline characteristics of the patients

	OAGB (n=21)	RYGB (n=43)	p
Gender, n (%)			0.313[a]
Female	18 (85.7)	33 (76.7)	
Male	3 (14.3)	10 (23.3)	
Age, mean±SD	42.43±12.08	42.56±12.18	0.968[b]
BMI, mean±SD	45.95±8.09	46.57±5.84	0.587[c]
Type 2 DM preop, n (%)	13 (61.9)	17 (39.5)	0.078[a]
Oral antidiabetic drug, n (%)	13 (61.9)	17 (39.5)	0.078[a]
İnsulin, n (%)	4 (19.0)	5 (11.6)	0.329[a]
HT preop, n (%)	9 (42.9)	12 (27.9)	0.180[a]
Asthma, n (%)	3 (14.3)	5 (11.6)	0.525[a]
Sleep apnea, n (%)	3 (14.3)	3 (7.0)	0.303[a]
Dispnea, n (%)	7 (33.3)	10 (23.3)	0.286[a]

[a]Fisher's Exact Test; [b]Independent Samples t-test; [c]Mann Whitney U Test; SD: Standard Deviation; OAGB: One anastomosis gastric bypass; RYGB: Roux-en-Y gastric bypass; BMI: Body mass index; DM: Diabetes mellitus; HT: Hypertension.

Table 2. Postoperative outcomes of the groups

	OAGB (n=21)	RYGB (n=43)	p
%EWL mean±SD	83.02±18.95	76.08±22.84	0.233[a]
%TWL mean±SD	35.43±5.26	34.70±11.31	0.723[a]
BMI (kg/m^2) mean±SD	29.62±5.42	30.14±5.05	0.704[a]
Type 2 DM postop, n (%)	1 (4.8)	3 (7.0)	0.602[a]
Oral antidiabetic drug, n (%)	1 (4.8)	3 (7.0)	0.602[a]
İnsulin, n (%)	-	1 (2.3)	0.672[a]
HT postop, n (%)	3 (14.3)	4 (9.3)	0.417[a]
Denovo reflux, n (%)	4 (19.0)	-	0.009[a]
B12 deficiency, n (%)	6 (28.6)	10 (23.3)	0.432[a]
D Vit deficiency, n (%)	6 (28.6)	5 (11.6)	0.093[a]
Fe deficiency, n (%)	6 (28.6)	13 (30.2)	0.567[a]
Dumping, n (%)	1 (4.8)	4 (9.3)	0.466[a]
Follow up (month) mean±SD	42.86±3.54	52.21±11.58	0.000[b]

[a]Independent Samples t-test; [b]Mann Whitney U Test; SD: Standard Deviation; OAGB: One anastomosis gastric bypass; RYGB: Roux-en-Y gastric bypass; EWL: Excess weight loss; TWL: Total weight loss; BMI: Body mass index; DM: Diabetes mellitus; HT:Hypertension.

the fact that RYGB was adopted earlier in our clinic, while OAGB was introduced later. Initially, concerns about the single anastomosis in OAGB causing complications, such as contamination of small intestinal contents into the stomach, made RYGB the preferred surgical option. Consequently, RYGB procedures outnumber OAGB by nearly two to one. Despite initial concerns among many surgeons about the risk of gastric and esophageal cancer[28], the shorter operation time and lower complication rate have gradually increased the popularity of OAGB.[28,29]

When comparing OAGB and RYGB in terms of weight loss, no significant differences were observed between the groups. The mean BMI decreased to 29.62±5.42 kg/m² in the OAGB group and 30.14±5.05 kg/m² in the RYGB group (p=0.704). Additionally, the %EWL and %TWL were similar between groups. We presented mid-term results from a single center, and although some studies have suggested that OAGB leads to more effective weight loss in the short term, long-term outcomes indicate that both operations have similar effects on weight loss.[30] However, it should be noted that a significant portion of these studies are not randomized, and few randomized trials have a follow-up period exceeding five years.[26,27,31-34]

According to the five-year data from the YOMEGA trial published by Robert et al.[30], OAGB was not inferior to RYGB in terms of percentage excess BMI loss at five years, with similar metabolic outcomes. However, they found that the most common adverse event in the OAGB group was clinical gastroesophageal reflux disease, and 8% of patients were converted from OAGB to RYGB. Initially, concerns about bile reflux in OAGB were tied to its resemblance to Billroth II surgery. However, due to the narrow and long gastric pouch and the narrow gastroenterostomy anastomosis, the adverse effects were less than expected. Additionally, the long biliary limb and the metabolic differentiation of bile in the intestine may reduce the impact of bile reflux. In our study, postoperative reflux was the most significant comorbidity in OAGB patients, but it was managed effectively with medical treatment.

Both gastric bypass procedures cause anatomical changes in the gastrointestinal system, reducing stomach volume and gastric acid secretion, which hampers proper food digestion. The postoperative liquid and pureed diets also affect vitamin intake. We observed vitamin D, B12, and iron deficiencies in our patients, with no significant difference between groups. OAGB and RYGB are both malabsorptive procedures requiring careful attention to potential nutritional deficiencies. Overlooking these deficiencies can lead to serious problems, including protein malnutrition and negative effects on bone metabolism.[35-37] We recommend lifelong follow-up to monitor vitamin levels and provide necessary supplements.

One limitation of our study is that it was retrospective. There is a lack of literature on this topic, largely due to the small number of prospective studies and the short follow-up periods of existing studies. Additionally, the method for measuring small bowel length, which provides valuable information for standardizing groups, was not recorded in this study. Another limitation is the absence of preoperative nutritional assessments, which hinders a comprehensive evaluation of postoperative outcomes.

Conclusion

Both OAGB and RYGB are effective procedures for treating morbid obesity, providing similar improvements in obesity-related diseases. Large, randomized trials with long-term follow-up are needed to evaluate these operations in terms of nutritional outcomes and complications.

Disclosures

Ethics Committee Approval: This prospective anatomical and clinical study was approved by the Ethics Committee of the Ethics Committee of Samsun University Research and Training Hospital (Approval Number: 2024/5/11) and was conducted in the Department of Surgery at Samsun Training and Research Hospital Research and Training Hospital.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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