From one-anastomosis gastric bypass to Roux-en-Y gastric bypass: Causes and postoperative complications of a single center study

Original Article

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ABSTRACT

Introduction: Bariatric surgery emerges as a rapid and effective solution for obesity and its related co-morbidities. With long-term follow-up for one-anastomosis gastric bypass (OAGB), several complications arise that might necessitate surgical correction including a revision to normal anatomy or conversion to either Roux-en-Y gastric bypass (RYGB) or sleeve gastrectomy.

Patients and Methods: Between June 2020 to June 2022, we retrospectively reviewed medical records of patients who had OAGB at our institution and later had a conversion to RYGB. Exclusion criteria included if less than 18 years old, having previous upper gastrointestinal surgeries other than OAGB, having contraindications for abdominal insufflation, and not fit for general anesthesia. The Primary study objective was causes of conversion of OAGB to RYGB.

Results: A total of 65 patients were included. Several indications for conversion to RYGB exist; however, predominant cause was biliary reflux n=28 (43.1%) followed by marginal ulcer n=20 (30.8%). Two patients had surgical site infection. Four patients had respiratory tract infections. Two patients had intraluminal bleeding while one patient had intrabdominal (extraluminal bleeding). Both patients were managed conservatively, One patient had jejuno-jejunal anastomotic site stricture that was managed by surgical revision. One patient had anastomotic leakage with localized collection drained percutaneously. Differences between weight and BMI before undergoing RYGB and 1 year after follow-up were evaluated. Weight and BMI after 1 year were statistically lower compared with weight (115.2±16.5 vs. 89.8±11.25, *P=0.0001*) and BMI (35.8±4.69 vs. 27.9±3.18, *P=0.0001*) before RYGB.

Conclusion: Laparoscopic conversion to RYGB from OAGB is a safe effective surgical procedures with a low rate of complications.

Key Words: Bariatric surgery, one-anastomosis gastric bypass, revisional, Roux-en-Y gastric bypass.

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INTRODUCTION

Bariatric surgery emerges as a rapid and effective solution for obesity and its related co-morbidities. From 1975 to 2016, the prevalence of obesity is tripled, according to WHO, globally. Around 1.99 billion adults aged 18 years and older were considered overweight. With the rising prevalence of obesity globally, the search for primary and revisional surgeries with high effectiveness and minimal complications is ongoing[1,2].

The popularity of each procedure has changed over time: Laparoscopic sleeve gastrectomy, one-anastomosis gastric bypass (OAGB), and Roux-en-Y gastric bypass (LRYGB) are most common procedures done nowadays[3–5]. Data reported from the 2022 7th IFSO registry annual report showed that sleeve gastrectomy is the most commonly performed (61%) bariatric primary and revisional procedure globally followed by RYGB, 26%[6].

With long-term follow-up for OAGB, several complications arise that might necessitate surgical correction including a revision to normal anatomy or conversion to either RYGB or sleeve gastrectomy[7]. In a study with 20 years' of experience with OAGB, Almuhanna *et al*. evaluated 2,223 patients from 2001 to 2020. In the early period, the overall 30-days postoperative complications were 1.2% that later decreased to 0.4%. Nearly 5.1% of patients needed revisional surgery due to bile reflux, marginal ulcer, malnutrition, weight regain, and other causes[8]. Consistent findings were reported from databases of five medical centers in the USA by Johnson *et al*. 32 patients required revisional surgery after OAGB due to bile reflux, gastro-jejunostomy leak, malnutrition, and marginal ulcer[9].

Although OAGB emerged as a simplified technique to RYGB, long-term findings of OAGB showed the need for conversion to RYGB in some patients. Data from Egypt and our institution are scarce. In this study, we aim to

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share the experience of our institution on OAGB cases that required revision to RYGB.

PATIENTS AND METHODS:

We retrospectively reviewed medical records of patients who had OAGB at our institution between June 2020 and June 2022 and later had a conversion to RYGB from June 2022 to June 2023 and underwent prospective follow-up 12 months till June 2024.

Ethical committee approval from the faculty of medicine, at Ain Shams University was taken before the study and informed consent was signed by all patients. The study was carried out according to the guidelines and regulations.

Eligibility criteria

Patients with indications of conversion to RYGB were included. Indications included biliary reflux intractable to medical treatment, malnutrition, marginal ulcer, weight regain, and GERD (Gastroesophageal Reflux Disease). Exclusion criteria if less than 18 years old, had previous upper gastrointestinal surgeries, had previous bariatric surgeries other than OAGB, Contraindications for abdominal insufflation as those with severe cardiovascular or severe restrictive respiratory diseases, not fit for general anesthesia, major psychiatric illness, or pregnant.

Study outcomes

The primary study objective was the causes of the conversion of OAGB to RYGB. Secondary objectives included BMI (kg/m^2), TWL% [(operative weight – follow-up weight)/(operative weight) X 100]), EWL % [preoperative weight - current weight/(preoperative weight - ideal weight) X 100]), 30-days postoperative complications according to Clavien–Dindo classification and mortality. Ideal body weight was calculated as BMI of 25.

Malnutrition was defined as BMI less than 18.5 kg/m^2, or combined weight loss and reduced BMI (age-dependent cut-offs) or reduced sex-dependent fat-free mass index. Severe malnutrition was defined as a serum albumin level of less than 3.0 g/dl. Bile reflux was defined as the presence of upper abdominal pain, frequent heartburn, or episodes of bilious vomiting.

Preoperative workout

Preoperatively, a multidisciplinary team evaluated the candidates based on medical, nutritional, endocrinological, and psychiatric workup. Preoperative assessment included blood examinations, cardiology evaluation, and chest radiography. Psychiatric counseling was conducted to evaluate mental health contraindications to surgery. All patients had preoperative upper gastrointestinal endoscopy to confirm either biliary reflux, marginal ulcer, or GERD. pH impedance was performed to confirm the diagnosis of nonacidic reflux in the case of doubt. Also, all patients had preoperative computed tomography volumetry for preoperative surgical planning to assess pouch size.

Operative procedures

Under general anesthesia, positioning the patient, we used the laparoscopic approach. We converted the OAGB to RYGB, we started by adhesiolysis and identification of both the afferent limb and efferent limb.

The biliopancreatic limb was created by dividing the small bowel proximal to the gastro-jejunal anastomosis which was kept. The division was done by 60 mm linear stapler by white load. The biliopancreatic limb measured 150 cm as at the previous OAGB the gastro-jejunal anastomosis was created 150 cm distal to the Treitz Ligament. The alimentary limb was created to be one meter and the jejuno-jejunal anastomosis was done by 60 mm linear stabler by white loads. Followed by closure of mesenteric defects by nonabsorbable sutures. Intra-abdominal drain was left for one day (Figs 1-4).

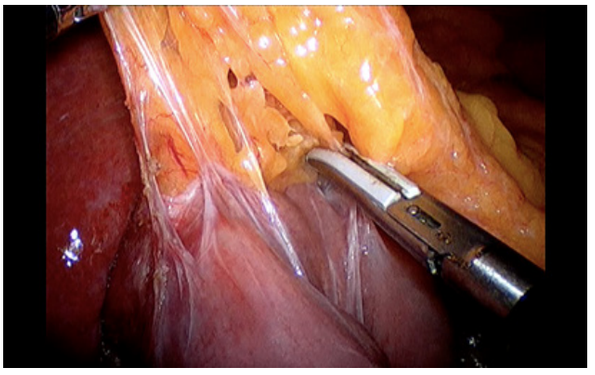

Fig. 1: Adhesiolys.

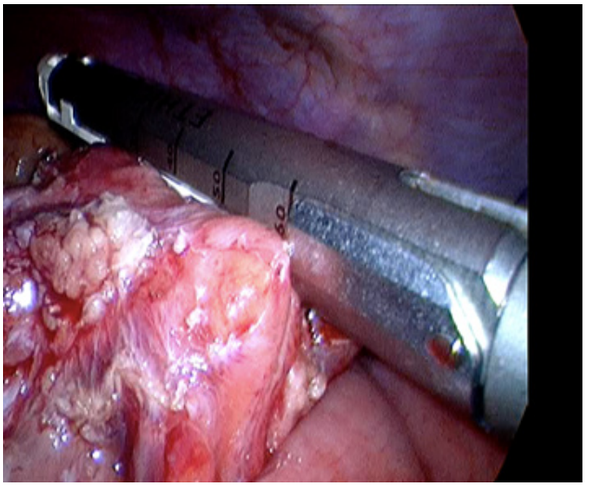

Fig. 2: Division of biliopancreatic proximal to gastro-Jejunal anastomosis.

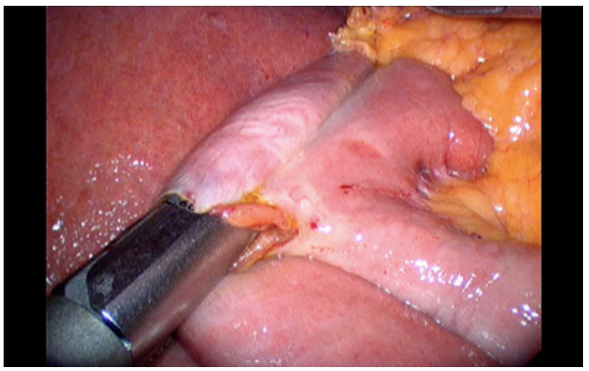

Fig. 3: Creation of jejuno-jejunal anastomosis.

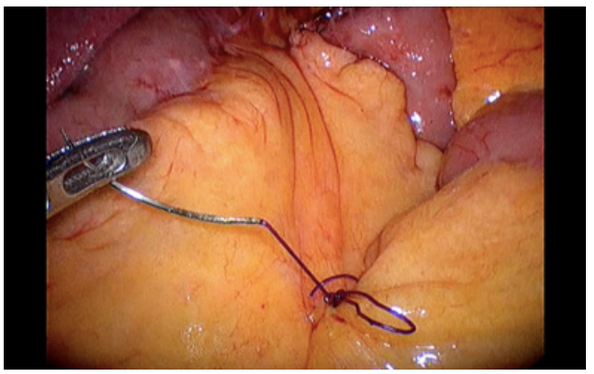

Fig. 4: Closure of mesenteric defects.

Postoperative follow-up

Patients were then followed postoperatively regularly for 12 months for assessment of BMI, EWL (Excess Weight Loss), TWL (Total Weight Loss), and postoperative complications. Patients were phone-called and asked to attend the next day for follow-up.

Statistical analysis

Statistical analysis was done through SPSS version 26.0, IBM Corporation in Chicago, Illinois, USA. To ensure our data had normal distribution, we performed Kolmogorov–Smirnov test and Shapiro–Wilk test. We used paired sample t test for the comparison of means of one group. *P value* less than 0.05 was considered statistically significant.

RESULTS:

From June 2020 to June 2022, 65 patients were eligible for our study. The mean age of our cohort is 39.2±7.44. Almost 69.2% were females. Other baseline characteristics are shown in (Table 1).

Several indications for conversion to RYGB exist; however, the predominant cause in our cohort is biliary reflux n=28 (43.1%) followed by marginal ulcer n=20 (30.8%). The average time, in months, for OAGB patients to convert to RYGB is 9±2.8 (Table 2).

Obese patients after conversion to RYGB were susceptible to 30-days postoperative complications. Two patients had intraluminal bleeding while one patient had intra-abdominal (extraluminal bleeding) and these three patients were managed conservatively Two patients had surgical site infections that were treated with appropriate antibiotics according to culture and sensitivity. Four patients had respiratory tract infections. One patient had jejuno-jejunal anastomotic site stricture that was managed by surgical revision. One patient had anastomotic leakage with localized collection drained percutaneously (Table 3).

Differences between weight and BMI before undergoing RYGB and 1 year after follow-up were evaluated. Weight and BMI after 1 year were statistically lower compared with weight (115.2±16.5 vs. 89.8±11.25, *P=0.0001*) and BMI (35.8±4.69 vs. 27.9±3.18, *P=0.0001*) before RYGB. (Table 4) also shows TWL and EWL at 1 year.

Table 1: Baseline characteristics of included participants

Age (mean±SD)	39.2±7.44
Sex, *n* (%)	
Male	20 (30.8)
Female	45 (69.2)
Weight before OAGB (mean±SD)	145.8±16.44
BMI before OAGB (mean±SD)	45.3±3.98
Weight before RYGB (mean±SD)	115.2±16.5
BMI before RYGB (mean±SD)	35.8±4.69
Comorbidities, *n* (%)	
HTN	9 (13.8)
DM	13 (20)
Dyslipidemia	11 (16.9)
DM and HTN	18 (27.7)
COPD	8 (12.3)
DM and Dyslipidemia	4 (6.2)
HTN and DM and COPD	2 (3.1)

Table 2: Causes of conversion to Roux-en-Y gastric bypass in our cohort and time from initial one-anastomosis gastric bypass to Roux-en-Y gastric bypass

Cause of conversion to RYGB	
Biliary reflux	28 (43.1)
Marginal ulcer	20 (30.8)
Malnutrition	3 (4.6)
Weight regain	8 (12.3)
GERD	6 (9.2)
Time to conversion to RYGB, months (mean±SD)	9±2.8

Table 3: 30-days postoperative complications and mortality after conversion to Roux-en-Y gastric bypass

Postoperative complications, *n* (%)	
No complication	54 (83)
Surgical site infection (SSI)	2 (3.1)
Respiratory tract infection (RTI)	4 (6.2)
Intra-abdominal bleeding	2 (3)
Intra-luminal bleeding	1(1.5)
Anastomotic stricture	1 (1.5)
Anastomotic leakage	1 (1.5)
Mortality	
No	65 (100)

Table 4: Difference in weight and BMI before Roux-en-Y gastric bypass and 1 year after Roux-en-Y gastric bypass. EWL and TWL at 1 year postoperatively

BMI before RYGB (mean±SD) vs BMI after 1 year	35.8±4.69 versus 27.9±3.18	*P*=0.0001
Weight before RYGB (mean±SD) vs weight after 1 year	115.2±16.5 versus 89.8±11.25	*P*=0.0001
TWL % 1year after RYGB	21.73±4.4	NA
EWL % 1 years after RYGB	84.4±44.4	NA

DISCUSSION

Years of research findings established the effectiveness of bariatric surgery in weight loss and control of obesity associated morbidities. Yet, bariatric surgery combining patient satisfaction and minimal complications is yet to be found. We believe that ideal bariatric surgery must provide sufficient weight loss, enough patient satisfaction, control over obesity-related comorbidities, and ability to revise to other bariatric surgeries if needed.

Throughout the study period, we evaluated 65 patients who had OAGB for conversion to RYGB. The predominant cause for conversion was biliary reflux n=28 (43.1%) followed by marginal ulcer n=20 (30.8%). Regarding 30-days postoperative complications, 11 patients had postoperative complications. As for difference between weight and BMI before undergoing RYGB and 1 year after follow-up, weight and BMI after 1 year were statistically lower compared with weight (115.2±16.5 vs. 89.8±11.25, *P=0.0001*) and BMI (35.8±4.69 vs. 27.9±3.18, *P=0.0001*) before RYGB.

In a retrospective study for 7 years by Jedamzik *et al*., 82 out of 1,025 patients with OAGB were converted to RYGB. Reasons for conversion were biliary reflux (n=42), marginal ulcers (n=11), anastomotic leakage/stenosis (n=17), malnutrition (n=9), and weight regain (n=3). The mean percent EWL (86.6%±33.1%) and TWL (35.1%±13.5%) reported by Jedamzik *et al*. were consistent with our findings[10].

Another retrospective study for 7 years by Kassir *et al*. reported cases (n=32 out of 2,780) converted to RYGB due to biliary reflux. Postoperative complications occurred in 12.5%. Mean BMI at 24 months follow-up was 27.2 kg/m^2 consistent with our mean BMI follow-up of 27.9 kg/m^2[11]. Their findings were also consistent with Antonopulos *et al*.[12].

Landreneau *et al*. retrospectively evaluated patients with OAGB from 2016 to 2018. Sixteen patients had conversion to RYGB with 18.8% due to biliary reflux and 12.5% due to malnutrition. Regarding postoperative complications, 37.5% of patients suffered complications with no mortalities reported[7].

Our study possesses several limitations including the retrospective study design that implies bias. Convenience sampling and single-center experience cannot be generalized. Finally, we were unable to assess weight loss done by OAGB.

CONCLUSION

Laparoscopic conversion to RYGB from OAGB is a safe effective surgical procedure with a low rate of complications. Bile reflux is the main cause of conversion which improved dramatically after the operation.

CONFLICT OF INTEREST

There are no conflicts of interest.

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