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One Anastomosis Gastric Bypass as A Primary Bariatric Surgery: A Retrospective Before and After Study of Medium-Term Follow-up

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Abstract

Introduction

Laparoscopic one-anastomosis gastric bypass (OAGB) is one bariatric surgery that can be used to treat obesity. It is considered a new procedure in the Gulf Region. The purpose of this study is to assess the initial experience with OAGB and its safety and efficacy as a primary bariatric surgery.

Method

We performed a retrospective before and after study on a consecutive group of patients who underwent bariatric surgery in the period between January 2015 – December 2018 in two hospitals. Data on weight loss, resolution of co-morbidities, as well as post-operative morbidity and mortality were recorded from patient's files.

Results

A total of 40 patients underwent OAGB as a primary surgery. The mean follow-up time was 31 months. The average weight prior to OAGB was 116 Kg. The minimum weight they have reached is 75 kg. TWL% at 1, 3, 6, and 12 months post-operatively was found to be 11, 18, 28, and 34.1% respectively. TWL% on the last day of follow-up was 34.3%. Patients with co-morbid conditions like hypertension, diabetes, gastroesophageal reflux disease, asthma, OSA, or menstrual irregularities reported either complete resolution or improvement of their condition. No marginal ulcers, anastomotic stenosis, or leaks occurred, however, one patient had bile reflux.

Conclusion

OAGB is safe and efficacious in decreasing the excess body weight and eliminating most of obesity related comorbidities when performed as a primary surgery.

Keywords: bariatric, one anastomosis gastric bypass, sleeve revision, weight regain.

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Introduction

The epidemic of obesity presents a major challenge to chronic disease prevention around the world (1). Obesity is associated with an increased risk of type 2 diabetes mellitus, hypertension, coronary heart disease, stroke, osteoarthritis, sleep apnea, and certain cancers (2). Conservative measures to treat obesity might be in effective in some patients, necessating bariatric surgery. Indications for bariatric surgery were identified by the National Institutes of Health (NIH) Consensus Development Panel in 1991(3) and were later revised by the American Bariatric Society in 2004 (4). These indications include having a Body Mass Index (BMI) of ≥40 kg/m^2 with no co-morbidities or BMI 35.0 to 39.9 kg/m^2 with at least one serious co-morbidity like type 2 diabetes, hypertension, dyslipidemia, obstructive sleep apnea, among others or a BMI of 30.0 to 34.9 kg/m^2 with uncontrollable type 2 diabetes or metabolic syndrome. Laparoscopic one-anastomosis gastric bypass (OAGB) can be performed as a primary or revision bariatric surgery to treat such patients. It consists of a long narrow gastric pouch created by dividing the stomach, and a loop gastrojejunostomy at the lower end of the pouch reducing body weight by both restrictive and malabsorptive factors (5-8). OAGB is a simple and safe procedure and can be easily revised, converted, or reversed (7, 9, 10). The purpose of this study is to assess our initial experience with the safety and efficacy of OAGB as a primary surgery to decrease the excess body weight and eliminating obesity related comorbidities.

Methods

Study Design

A retrospective before and after study was carried out in one public and one private hospital in Kuwait on consecutive patients who underwent OAGB as a primary bariatric surgery between

January 2015 to January 2018. The inclusion criteria for this study were patients aged 18-60 years', with no previous bariatric surgery. Exclusion criteria included patients who had a previous bariatric surgery or have underwent any intervention after the OAGB. Patients were not directly involved in this study but as their information was included, ethical approval was granted from the ministry of health for access to patient information data base system. This study is registered in research registry (researchregistry5298), and the work has been reported in line with the STROCSS criteria (11).

Preoperative preparation and operative technique

All patients were seen preoperatively by a dietician specialized in post bariatric surgery diet follow-up with knowledge in eating disorders assessment and management. All patients underwent a radiological barium swallow, gastric endoscopy and routine lab tests including nutritional, vitamins, liver, endocrine and coagulation profile. All surgeries were done by two experienced surgeons under the same way to reduce variation. All patients had OAGB laparoscopically with 4 ports and surgeon standing on the right side of the patient with the assistant on the left. Surgery started by creating a long gastric pouch using an EndoGIA 45mm stapler approximately 1.5 cm to the left of the lesser curvature to transect the gastric sleeve transversely in order to create the gastric pouch. An ante-colic end to side gastrojejunal anastomosis is then performed with a 30mm EndoGIA stapler to a jejunal loop 150 cm distal to the ligament of Trietz. The gastroenterostomy is then closed with continuous suture. A 36 French bougie (Ethicon) is then advanced to the efferent jejunal loop, to inject blue dye to check for anastomotic leak. The omentum was not divided.

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Post-operative Care

All the patients received care under a standard pathway. Patients were encouraged to ambulate right after surgery and oral feeding was allowed to start on postoperative day one after the performance of a gastrograffin swallow leak test. Patients were discharged home on the third postoperative day. Patients were followed up by a surgeon and a dietician, once a month for the first 2 postoperative months and every 3 months thereafter. Patients were advised to take a daily multivitamin tablet as a supplement. Iron supplement, vitamin B12, calcium and vitamin D supplement. For the first 6 months only, patients were prescribed a proton pump inhibitor and a bile salt in the form of ursodiaxicolic acid. Routine lab tests including nutritional, vitamins, liver. Endocrine and coagulation profile were performed once every 3 months in the first year, once every 6 months in the second year and once yearly thereafter.

Ethical Considerations, Data collection, and Statistical Analysis

Ethical approval for the conduction of this study was granted. A list of all the patients who underwent OAGB since January of 2015 onwards taken from the operation theatre surgical cases database. Patients were screened back in time and those who have had OAGB as a primary bariatric procedure were selected for this study. This gave a total of 40 patients. Co-morbidity status was measured as: hypertension is blood pressure > 120/80 requiring medication for control, and diabetes is fasting blood sugar of more than 6.9, HBA1C of more than 6.5, or 2-h OGTT plasma glucose of more than 11 requiring oral hypoglycemic agents or insulin for control. Asthma as reversible obstructive pulmonary disease requiring prophylactic therapy. GERD as endoscopic diagnosis of esophagitis and patient is symptomatic on regular PPI. OSA was diagnosed using polysomnographic evidence and patient is on night CIPAP. Remission was measured as follows: for hypertension and diabetes, regulation of blood pressure or blood sugar level to normal while

stopping all medications; for asthma as dropping the need of taking daily preventative therapy and having no exacerbations in the last 6 months; for GERD as dropping the need of taking PPIs and asymptomatic; for OSA as dropping the need of using night CiPAP. Improved was measured as follows: for hypertension and diabetes as decreasing the amount of oral hypertensive or hypoglycemic drugs by at least 1 drug AND having control of the disease; for Asthma as a drop in at least one severity class; for GERD as a drop in the requirement of PPI for symptomatic relief. All information were derived from patients' medical file records.

Statistical analysis was conducted using IBM SPSS Version 25. The difference in means test was used for comparison of mean weight and BMI before and after OAGB and for normally distributed laboratory investigations. Man-Whitney U test was used for testing laboratory investigation results that had a skewed distribution. $P < 0.05$ was considered significant.

Results

Our sample size was 40 consisting of 80% females, and the mean age was 40±10.4 (20 – 60). The mean follow-up time was 31±12.3 months (Table 1). Four of our patients had previous insertion of intragastric balloon for weight loss but none had a bariatric procedure. The weight loss profile of our patients is presented in Table 2 and Figures 1-3. The mean weight and BMI prior to OAGB were 116± 25.3 Kg (82 – 180 Kg) and 43.7±7.7 kg/m2 (32.9 – 70.3 kg/m2), respectively. The minimum mean weight and BMI they have reached after OAGB is 75±19.7 kg (50 – 134 kg) and 28.3±7.7 kg/m2 (18.9 – 52.3 kg/m2), respectively. TWL% at 1, 3, 6, and 12 months post-operatively was found to be 11, 18, 28, and 34.1% respectively. TWL% on the last day of follow-up was 34.3%. EWL % at 1, 3, 6, and 12 months post-operatively was found to be 29, 48, 73, and 89%, respectively. EWL% on the last day of follow-up was 84%. At the last day of follow up post

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OAGB, only one patient had an EWL% of less than 25 (2.5%), while 5 (12.5%) had an EWL between 25-50%, and 34 (85%) had an EWL% of more than 50 (Table 3).

We have investigated blood laboratory results of 23 of our patients before and after OAGB. This included hemoglobin, mean corpuscular volume (MCV), iron, albumin, total cholesterol, triglycerides (TG), High Density Lipoproteins (HDL), Low Density Lipoproteins (LDL), Lactate Dehydrogenase (LDH), calcium, glucose, vitamin D, and vitamin B12. Among these tests, only TG showed a significant difference before and after the OAGB dropping from 1.33 to 0.88 (p-value .007) as seen in Table 4.

All hypertensive and /or diabetic patients reported either complete resolution or improvement of their condition as presented in Table 3. Six patients complained of GERD pre-operatively, 5 of which had complete resolution of their symptoms and stopped taking PPI, and one patient had better control of their condition and only use PPI occasionally. All seven patients who had OSA in our study completely had full control on their condition after OAGB and have dropped the need of using CIPAP at night. Seven patients were suffering from menstrual irregularities of > 35 days interval, all of them successfully had their menstrual cycle normalized by the last day of follow up (Table 5).

When it comes to complications, our study reports no incidence of marginal ulcers, leaks, anastomosis stenosis, however, bile reflux occurred with one patient (2.5%) as presented in Table 6.

Discussion

In this study we report our initial experience with OAGB as a primary procedure in Kuwait which is part of the Gulf Region. We report excellent results in terms of weight loss and resolution of

comorbidities with no mortality and only one patient with bile reflux. OAGB is a promising bariatric procedure given its technical simplicity and ease of revision. However, when compared to RYGB or other bariatric procedures, OAGB is less preferred to date although studies continue to show its safety and efficacy. For example, Rhenwalt et al. have reported comparable TWL% (36 vs 34%) and resolution of comorbidities at 3 years of follow-up between OAGB and RYGB with the former having significantly shorter operation time (80 vs 103 minutes), dumping syndrome (3.6 vs 6.6%), and anastomotic stenosis (1.9 vs 14.7%) when compared to RYGB. GERD incidence however was higher with OAGB when compared to RYGB (3.6% vs 0.7%)(12). If GERD develops after primary OAGB, Olmi et al. have reported their experience of complete resolution of signs and symptoms after performing a Braun anastomosis to treat this condition (13).

Lee et al. experience with OAGB actually reports that it is more effective than RYGB in terms of weight loss with a lower BMI (27.7 vs 29.2) at 5 years and higher EWL% (72.9 vs 60.1) when compared to RYGB. Not only that, but also they have seen less major complications with OAGB (1.8 vs 3,2%). Both procedures had a similar revision rate and resolution of co-morbidities.

Surgeons continue to fear OAGB due to complications like bile reflux, marginal ulcers, and malnutrition, however, the incidence of such complications are repeatedly reported in the literature to be quiet low (14-15). Hussain et al., for example, have reported that complications arising after OAGB are uncommon affecting 2.3% of patients and if they occur, they can be successfully managed by revision RYGB or Braun anastomosis. Those complications included severe diarrhea (0.4%), bile reflux (0.3%), bleeding (0.3%), liver decompensation (0.2%), gastrojejunal stenosis (0.2%), perforated ulcer, excess weight loss, and protein malnutrition affecting 0.1% each (16). These numbers are very low and occur in the minority of patients undergoing OAGB. In this report we had one patient who developed bile reflux post-operative. This patient was complaining of

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heart burn and gastroscopy revealed pouchitis with bile present, he was managed conservatively with Carafate 1 gm, QID and PPI.

A comprehensive review by Mahawar KK et al. concluded that although biliary reflux might complicate OAGB resulting in histologic gastritis, it does not necessarily become symptomatic. The review found no increased risk of gastric or esophageal cancer after OAGB. It is worth noting that H. pylori plays a critical role in the development of gastritis and gastric cancer and its presence is a prerequisite, so eradication is essential in all patients before OAGB. The review commented on marginal ulcer as a complication to be uncommon and the high occurrence reported by some studies is due to inaccuracy, bias, or poor follow-up (14). The reported marginal ulcer rate by 3 big well conducted studies ranged from 0.6- 4.0%, which is similar to that seen with RYGB (10, 17,18.

From our experience OAGB was very effective in reducing weight with a TWL% of 34% at 12 months that have persisted to the last day of follow up (31 months). The average patient's weight and BMI dropped significantly more than 40 kilos and 15 BMI grades respectively. We also report it to be very effective in eliminating and improving co-morbidities like hypertension, diabetes, asthma, GERD, OSA, and menstrual irregularities. When it comes to complications, our study found no major morbidity or mortality following OAGB as a primary surgery, however, one case of bile reflux occurred.

Limitations of this study includes the small sample size of 40 patients, it is worth mentioning, however, that that this is the first report from a GCC country of its experience with primary OAGB.

Conclusions

This study significantly reports on the safety and efficacy of the OAGB to decrease the excess body weight. Our results also indicate that OAGB is a successful surgical procedure to eliminate most of the obesity related comorbidities.

Conflict of Interest

No conflict of interest declared for all authors

Funding

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Table 1: Descriptive Data

Descriptive Data	
Gender N = 40 (%)	32 (80) Females 8 (20) Males
Age (mean+Std.)	39.9 (10.4)
Mean follow up time (mean+Std.)	31 (12.3)

Table 2: Weight Loss Profile

	Weight Mean (s.d.)	BMI Mean (s.d.)	EWL Mean (s.d.)	TWL Mean (s.d.)
Pre-operative	116.1 (25.3)	43.7 (7.8)		
At 1 month	101.8 (24.2)	38.2 (6.9)	28 (17.2)	10.6 (5.4)
At 3 months	94.2 (24.2)	35.1 (6.9)	47.6 (24.5)	17.9 (7.5)
At 6 months	83.8 (25.4)	31.0 (7.4)	73.2 (34.4)	27.9 (11.1)
At 12 months	76.6 (25.0)	28.4 (7.2)	88.9 (39.8)	34.1 (11.5)
At LDF	74.6 (19.7)	28.3 (7.7)	84.3 (39.2)	34.3 (16.5)
P- value	<.000	<.000		

*LDF: Last day of follow up
P-value tested for difference in means of weight and BMI before and after OAGB. It was significant at p-value <.000

Table 3: Percent of patient achieving successful weight loss (>50% EWL) after OAGB at last day of follow up.

Excess Weight Loss (EWL)	N= 40 (%)
EWL % <25	1 (2.5)
EWL% 25-49.9	5 (12.5)
EWL% >50	34 (85)

Table 4: Laboratory investigation results of 23 patients before and after 1 year of OAGB

Blood Test	**Before OAGB Mean±SD**	**After OAGB Mean±SD**	**P-value**
Albumin	38.1±2.6	38.9±4.8	.581
TG	1.33±.6	.88±.29	.007
HDL	1.26±.38	1.36±.4	.451
Cholesterol	5.1±1	4.4±.89	.080
LDH#	4.8±3.2	2.68±.6	.081
Hemoglobin	128.5±14.3	125.4±17.3	.556
MCV	80.3±6.2	83.1±6	.173
Iron#	15.7±14	18.5±6.4	.145
Calcium	2.4±.09	2.3±.11	.234
Glucose	5.5±.96	5.4±1.5	.893
Vitamin B12#	365.7±356	293±138	.704
Vitamin D#	37.3±20.5	55.6±33.4	.139

*Normally distributed variables mean<1/3SD – difference in means t-test
#Skewed variables mean >1/3SD – difference in medians Man Whitney U test

Table 5: Co morbid condition status after OAGB

Comorbid condition	Before OAGB	After OAGB	
	On Medication	Remission* %	Improved Control** %
Hypertension	10	4 (40%)	6 (60%)
Diabetes Type 2	9	4 (44%)	5 (56%)
Asthma	11	8 (73%)	2 (17%)
GERD	6	5 (83%)	1 (17%)
OSA	7	7 (100%)	

*Remission was measured as follows: for hypertension and diabetes, regulation of blood pressure or blood sugar level to normal while stopping all medications; for asthma as dropping the need of taking daily preventative therapy and having no exacerbations in the last 6 months; for GERD as dropping the need of taking PPIs and asymptomatic; for OSA as dropping the need of using night CiPAP.

**Improved was measured as follows: for hypertension and diabetes as decreasing the amount of oral hypertensive or hypoglycemic drugs by at least 1 drug AND having control of the disease; for Asthma as a drop in at least one severity class; for GERD as a drop in the requirement of PPI for symptomatic relief

#Seven patients had PCO diagnosed and had irregular periods of > 35 interval, all of which reported regulation of their period at LDF.

Table 6: Complications after OAGB

Complications	N= 40 (%)
Bile Reflux	1 (2.5%)
Marginal Ulcers	0
Leak	0
Anastamosis Stenosis	0

Figure 1. Weight & BMI comparison before and after OAGB

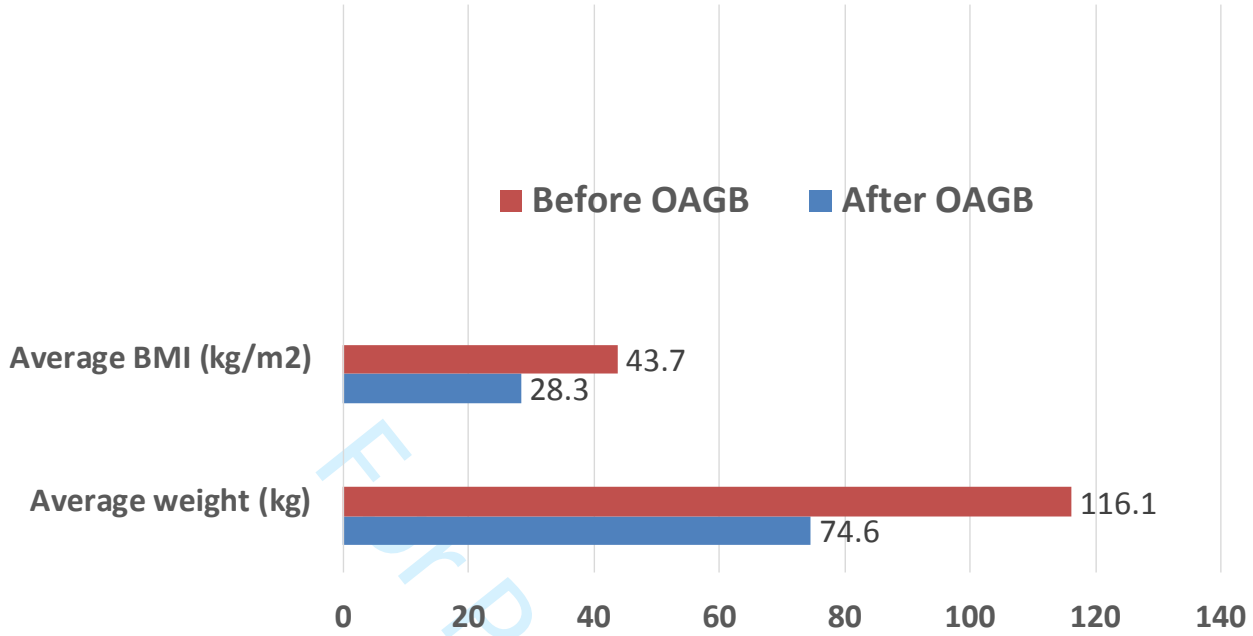

Figure 2: %EWL in relation to time after OAGB
EWL: excess weight loss, LDF: Last day of follow-up

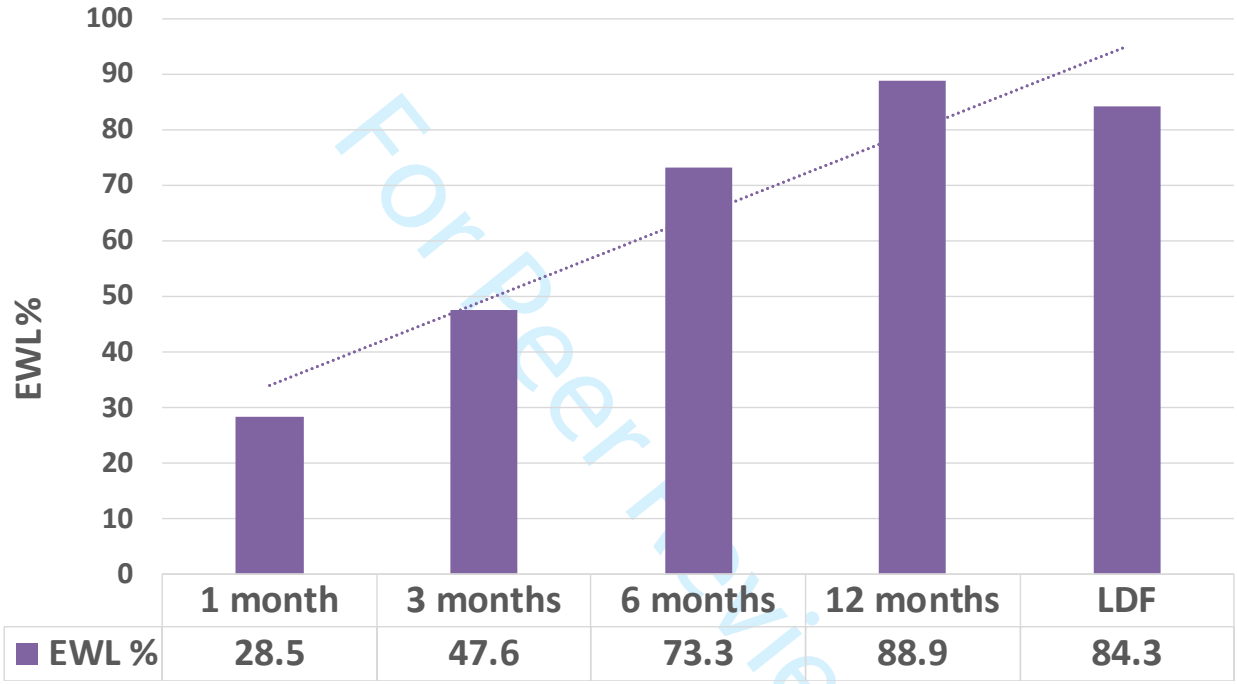

Figure 3. %TWL in relation to time after OAGB
TWL: Total weight loss weight loss, LDF: Last day of follow-up