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Original Article

Constipation by WEXNER Score in Patients with Morbid Obesity after Gastric Bypass Surgery

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Abstract

In this study, we aimed to evaluate the effect of bariatric surgery on constipation followed by the surgery.

This prospective cohort study included 237 patients with morbid obesity, who were candidate for Laparoscopic Roux-en-Y Gastric Bypass (RYGB), and One-Anastomosis Gastric Bypass (OAGB) in Obesity Clinic of Rasoul Akram Hospital in 2012-014. The severity of constipation was measured by Wexner Constipation Score (WCS) before and three months after the surgery. Paired t-test, Mc Nemar test, and logistic regression were applied for the analyses. Mean age and BMI of the 237 patients were 31.59±5.92 years and46.59±5.81kg/m2, respectively. Mean WCS decreased significantly in OAGB group (3.1±4.27 vs. 4.72±4.81, P=0.003), while the reduction in WCS mean score was not significant in RYGB group (4.5±4.73 vs. 4.63±5.19, P=0.793).

The proportion of constipation reduced (48/103 vs. 32/103) significantly in OAGB group (P=0.002). Conversely, the decrease in this proportion (from 58/134 to 57/134) was not significant in RYGB group (P=0.06). Considering the confounding role of diet and supplementary intake of the patients, the results of this study showed that the frequency of constipation reduced in morbidly obese patients undergoing obesity surgery and postoperative nutritional recommendations. The comparison between techniques showed that OAGB reduced the constipation score and proportion, while this decrease was not significant in RYGB.

Keywords: Morbid obesity; Gastric bypass, Bariatric surgery; Constipation

Introduction

Morbid obesity, defined as Body Mass Index (BMI) ≥40 kg/m2, is a major health problem worldwide and is associated with various life-threatening comorbidities and chronic diseases. One of the frequent complaints of these patients are upper and lower gastrointestinal (GI) symptoms such as vomiting, abdominal pain, bloating, diarrhea, and constipation (1). The mechanism of constipation in patients with morbid obesity is suggested to be the dysmotility and dyspepsia, resulting from high weight (2). As bariatric surgery is the treatment of choice for patients with morbid obesity, most patients in this BMI category undergo surgical procedure that may itself cause various structural complications, and GI symptoms such as nausea, vomiting, constipation, diarrhea, pain, and GI bleeding, as it directly manipulates abdomen (3,4). Therefore, certain GI complications are reported to increase and others decrease after bariatric surgery, which may also vary according to the type of surgery (5-7). Some studies have reported that constipation may worsen due to postoperative dehydration, lower food intake and dysmotility of GI tract, (8). while others have reported that they will improve few months after surgery (9).

The total prevalence of constipation is determined in general population at about 15%, however, its prevalence in patients with morbid obesity needs to be further investigated. Iranian studies have reported the total prevalence of constipation in general population (to vary from 1.4-37%) (10). As anticipated, constipation will be found more frequently in patients with obesity than the general population, as both (constipation and obesity) are more common in women and less physically active individuals, and both are associated with age, diet, socioeconomic status and educational level(11,12) Bariatric surgery improves various comorbidities these patients(7). however, the literature is sparse on constipation.

As long as constipation has a great impact on quality of life of the patient and imposes social and economic burden on the patients(13,14). in addition to the fact that it increases the risk of gastro-intestinal cancer,(15) assessing the effect of bariatric surgery on this phenomenon is of great importance. Thus, the present study aimed to evaluate the effect of gastric bypass on constipation severity in patients with morbid obesity.

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Methods

Patients: This prospective cohort study included 237 patients with morbid obesity who were candidates for bariatric surgery at the center which the authors are affiliated to, in … from 2012 to 2014. Patients with BMI ≥40 or ≥35 kg/m2 with associated comorbidities were defined as patients with morbid obesity.(16) The patients were scheduled for laparoscopic bariatric procedures including One-Anastomosis Gastric Bypass (OAGB) or Roux-en-Y Gastric Bypass (RYGB) during the study period. Patients with GERD (grade C and D) were assigned to RYGB. Patients with previous anal sphincter trauma, previous anorectal surgery, irritable bowel syndrome, inflammatory bowel disease and paraplegia/paralysis, were not included in the study. Any patient with major peri-surgical complications including anastomosis leak, wound infection, re-operation, and re-hospitalization, and any patient receiving antibiotic therapy were excluded from the study.

Examined variables: Sex, age, weight, and height of all the participants were registered preoperatively and three months postoperatively by a physician visiting the patients at the Obesity Clinic in the studied hospital. All patients were informed about the objectives of the study and written informed consent was obtained. Wexner Constipation Score (WCS) was used to evaluate severity of constipation at first visit and 3 months after surgery. The questionnaire items were explained to the participants and they completed the questions under observation of one of the research team member (SA). Wexner constipation questionnaire contains 8 variables, in three domains including abdominal pain, frequency of bowel movements, and painful evacuation, with a total score of 30.patients with a score ≥ 5 was considered as constipated.(17)

Surgical technique: RYGB operation was initiated by placing five trocars (three 12 mm and two 5 mm trocars). In most of operations, releasing the His angle was performed. A small gastric pouch with a length of 6-8 cm was created by opening a window in the lesser sac and then, blue linear endo-stapler was used to transect the stomach first horizontally and then vertically to the angle of His. The omentum and the transverse colon were retracted cranially, exposing the ligament of Treitz. A 150cm Roux limb was bypassed, with creation of gastrojejunostomy (GJ) using linear 45mm blue endo-stapler. By determining a 50 cm alimentary limb (AL), the jejunojejunal anastomosis was performed with linear 60mm white endo-stapler and the enterotomy sites were closed hand sewn in single-layer fashion by using PDS 2/0. Only jejuonjejunal mesenteric defects were closed. Air leak test at the end of operation was done and a silicone drain was inserted near GJ anastomosis.
The OAGB operation was similar to RYGB, with some differences, including that we created a long and narrow gastric tube, and the first stapler was fired transversally with a linear green or tan 60 mm endo-stapler distal to Crow's foot and then continued vertically with linear 60mm blue endo-staplers to angle of His. After identification of Treitz' ligament, 200 cm distal to it, a loop of jejunum was anastomosed to long and narrow gastric tube with a 45mm blue endo-stapler and the enterotomy was closed hand sewn. The leak test and drain placement were as the same as RYGB.
After the surgery, all patients received daily multivitamins + minerals. Also all of the patients (both OAGB and RYGB) were on clear liquid diet for first 2 weeks, then two weeks of semisolid, and then regular high protein diet. The main outcome of the study was the Wexner score of the patients. The proportion of the patients with constipation (Wexner score ≥ 5) was the secondary outcome of the study.

Statistical analyses: Mean ± SD were calculated for quantitative variables, and qualitative variables were described via frequency (%). Paired t-test and Mc Nemar test were applied to compare quantitative and qualitative variables pre- and post-operatively, respectively. Pearson's correlation coefficient was used to assess the association between variables. Binary logistic regression was used to estimate the effect of potential covariates on the postoperative constipation occurrence. Odds ratio (OR) and %95 confidence interval (CI) was also reported. Hosmer-Lemeshow statistics was calculated for model goodness-of-fit. Statistical analysis was performed using SPSS software version 20. P-value less than 0.05 was considered statistically significant.

Results

A total of 237 patients underwent bariatric surgery; 209 (88.2%) were female. The mean ± SD of patients' age was 31.59 ± 5.92 years and that of BMI was 46.59 ± 5.81 kg/m2. Table 1 shows that BMI decreased significantly after the surgery compared with the baseline in all patients (46.59 ± 5.8 to 38.01±5.73 kg/m2, P < 0.001).
At the time of the surgery, mean ± SD of WCS was 4.67 ± 5.02 and 106 (44.7%) patients were diagnosed with constipation (WSC ≥ 5). There was no significant difference in frequency of the patients with constipation between females and males preoperatively (45% vs. 42.9%, P=0.832). In addition, there was no statistically significant association between WCS and BMI preoperatively (r=0.041, P=0.527). A total of 134 (56.5%) and 103 (43.5%) patients underwent RYGB and OAGB, respectively. The prevalence of preoperative constipation was similar between the patients, candidate for the two surgical methods: 58 (43.3%) in RYGB and 48 (46.6%) in OAGB (P=0.611) (results are not shown).

Table 2 revealed that WCS mean decreased significantly postoperatively compared with the baseline (4.67 ± 5.02 vs 3.89 ± 4.58, P=0.036). In addition, McNemar test in table 3 demonstrates that the proportion of the patients involved with constipation significantly decreased from 106 (of 237: 44.7%) to 89 (of 237: 37.6%) after the surgery (P=0.001).

There was a negative correlation between BMI reduction and WCS reduction, although this correlation was not statistically significant (r=-0.07, P=0.329).
Figure 1 illustrates the frequency of the patients with constipation and non-constipation in terms of the preoperative BMI and surgery type. Table 2 shows that mean WCS decreased significantly in OAGB group (4.72 ± 4.81vs 3.1 ± 4.27, P=0.003). WCS reduced non-significantly in RYGB group (4.63 ± 5.19vs 4.5 ± 4.73, P=0.793).
As shown in table 3, the proportion of patients with constipation reduced from 46% (48/103) to 31% (32/103) significantly in OAGB group (P=0.002). Constipation proportion decreased from 43% (58/134) to 42% (57/134) in RYGB group was which was statistically significant (P=0.044).
Moreover, WCS mean decreased significantly in patients with 40 ≤ BMI < 50 (P=0.04), conversely the reduction in WCS mean was neither statistically significant in patients with 35≤ BMI< 40 nor BMI≥ 50 (P=0.33, P=0.67). In addition, table 3 illustrates that the proportion of the patients suffering from constipation decreased after surgery compared to before surgery in different BMI categories. However, none of the decreases were statistically significant (P>0.05).
Binary logistic regression revealed that OAGB patients had an odds of 1.75 (1.47, 4.4) than RYGB patients for postoperative constipation controlling for preoperative BMI and constipation status (Table 4).In addition, odds of postoperative constipation for the patients who were constipated preoperatively was 2.53 (1.005, 3.07). Preoperative BMI was not statistically associated with the odds of postoperative constipation which is confirmed by the findings in table 3(P>0.05). Hosmer-Lemeshow statistics of 4.56 implies a decent model fit.

Table 1. BMI of the patients pre- and postoperatively

BMI (kg/m²)*		*Preoperatively*	*Postoperatively*	*P value*
BMI, mean ± SD		*46.59 ± 5.8*	*38.01 ± 5.73*	***< 0.001***
BMI categories, N (%)				***< 0.001***
	< 35	*0*	*66 (27.8)*	
	35- 40	*41 (17.3)*	*69 (29.1)*	
	40- 50	*139 (58.6)*	*65 (27.4)*	
	> 50	*57 (24.1)*	*2 (0.8)*	

Table 2. *Comparison of mean ± SD WCS mean pre- and postoperatively*

Variable	***Preoperative***	***Postoperative***	***P value***
Type of surgery			
RYGB*	*4.63 ± 5.19*	*4.5 ± 4.73*	*0.793*
OAGB**	*4.72 ± 4.81*	*3.1 ± 4.27*	*0.003*
BMI** categories***			

35- 40 (N=41)	4.44 ± 4.85	3.58 ± 3.53	0.33
40- 50 (N=139)	4.68 ± 4.82	3.74 ± 4.25	0.04
≥ 50 (N=57)	4.82 ± 5.56	4.47 ± 5.89	0.67
Total	4.67 ± 5.02	3.89 ± 4.58	0.036

*RYGB: Roux-en-Y Gastric Bypass, **OAGB: One- Anastomosis Gastric Bypass, ***BMI: Body Mass Index

Table 3. *Comparison of WCS ≥ 5 pre and postoperatively in three BMI categories*

		Postoperatively		
		WCS* ≥ 5	WCS < 5	P value
Variable	Preoperatively	N (%)		
Type of surgery				
RYGB* (N=134)				0.99
	WCS ≥ 5	30 (51.7)	28 (48.3)	
	WCS < 5	27 (35.5)	49 (64.5)	
OAGB (N=103)**				0.011
	WCS ≥ 5	22 (45.8)	26 (54.2)	
	WCS < 5	10 (18.2)	45 (81.8)	
BMI* categories**				
35< BMI < 40 (N= 41)				0.45
	WCS ≥ 5	9 (47.5)	10 (52.5)	
	WCS < 5	6 (27.3)	16 (72.7)	
40< BMI < 50 (N=				0.32

139)				
	WCS ≥ 5	*33 (53.2)*	*29 (46.8)*	
	WCS < 5	*21 (27.3)*	*56 (72.2)*	
BMI > 50 (N= 57)				*0.42*
	WCS ≥ 5	*10 (40)*	*15 (60)*	
	WCS < 5	*10 (31.3)*	*22 (68.8)*	
Total (N=237)				*0.001*
	WCS < 5	*37 (18.2)*	*94 (81.8)*	
	WCS ≥ 5	*52 (49)*	*54 (51)*	

* RYGB: Roux-en-Y Gastric Bypass, ** OAGB: One-Anastomosis Gastric Bypass, *** BMI: Body Mass Index

Table 4. *The effect of preoperative constipation, preoperative BMI, and surgery type on the postoperative constipation using logistic regression*

Variable	***OR (%95CI)§***	***P***
Surgery (OAGB* vs RYGB**)	*1.75 (1.47, 4.4)*	*0.048*
Preoperative constipation (WCS≥5 vs WCS<5)	*2.53 (1.005, 3.06)*	*0.001*
35≤ Preoperative BMI < 40***	*-*	
40≤ Preoperative BMI< 50	*1.12 (0.47, 2.66)*	*0.79*
Preoperative BMI≥ 50	*1.23 (0.63, 2.38)*	*0.54*
§Odds ratio with %95Confidence interval, *OAGB: One-Anastomosis Gastric Bypass, ** RYGB: Roux-en-Y Gastric Bypass, ***BMI: Body Mass Index		

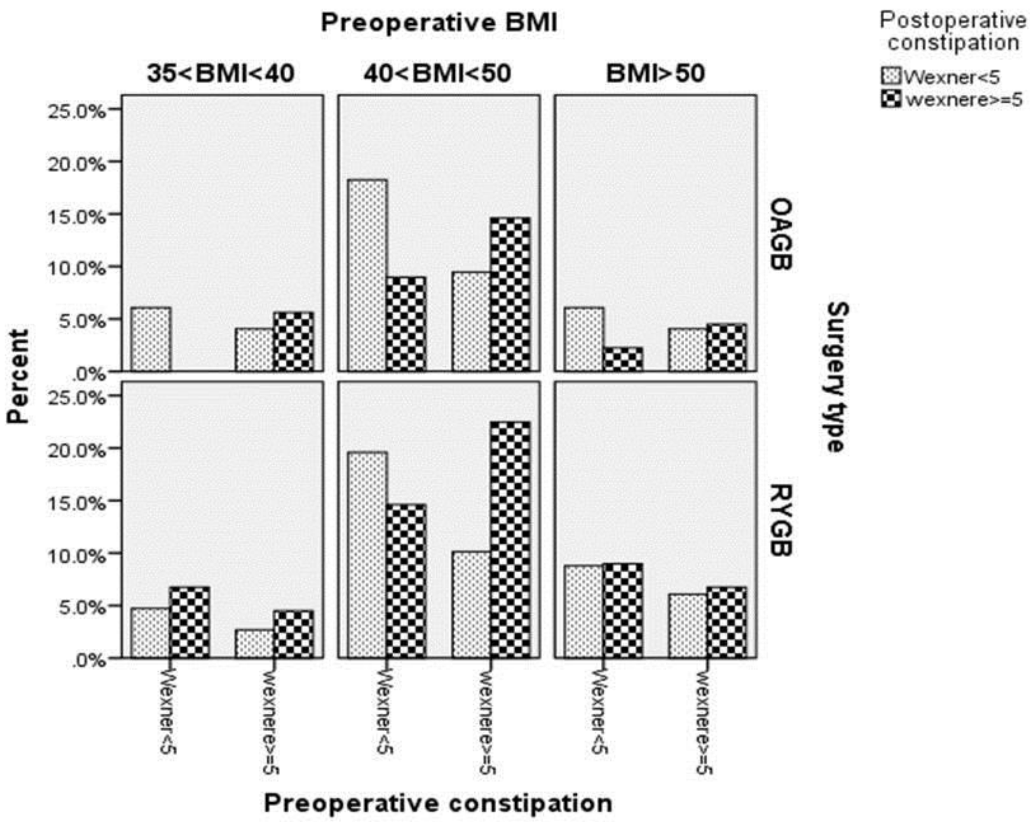

Figure 1. The frequency of patients with constipation and without constipation in terms of the preoperative BMI and surgery type

Discussion

The results showed a significant decrease in mean WCS, as well as a significant decrease in the proportion of patients with constipation after bariatric surgery compared to the baseline with higher odds of postoperative constipation in RYGB and patients with preoperative constipation.

Morbid obesity has many comorbidities including constipation that lies under the fact that most of the patients with morbid obesity have low physical activity and high fat calorie diet. (11, 12) In addition, increased abdominal pressure, binge eating, and gut hormones may predispose the patients with obesity to constipation. (18, 19) Constipation not only causes pain and abdominal cramps for the patients, it predisposes the patients to many adverse consequences such as hemorrhoid, fistula, anal fissure, and perianal abscess. As most of these patients are indicated for obesity surgery, performed by various techniques, detecting a procedure that is more effective on constipation treatment could help surgeons to select the most appropriate procedure for each patient in addition to other clinical criteria, which was the main objective of the present study.

In addition to the mechanisms explained above that makes the patients with morbid obesity prone to constipation, lifelong iron supplementation may be required in the patients undergoing RYGB based on the anatomical and functional changes that will also affect constipation (20) and as far as the authors are concerned, none have investigated the effect of OAGB on bowel habit of patients. Therefore,

we selected these two surgical techniques to determine the state of constipation in the patients after surgery.

There are few studies on patient's bowel habit after bariatric surgery, meanwhile studies have selected different bariatric procedures, like sleeve,(21) RYGB, adjustable gastric banding (AGB), and biliopancreatic diversion (BPD). 5 Foster and colleagues investigated the gastrointestinal symptoms using GSRS score in 35 patients undergoing RYGB with mean BMI of 47.8 ± 4.9 kg/m2 (that was similar to mean BMI of our patient: 46.59 ± 5.81 kg/m2) and reported 12% increase in constipation rate (22) that is contrary to the results of the present study, as in our study, constipation decreased after RYGB, but was not statistically significant. This difference between the results of studies could be due to the differences in surgical technique and different mean values of patients' weight loss after surgery, which seemed higher in the present study than their report. In 2009, Ballemand colleagues followed 763 patients undergoing RYGB with mean BMI of 48.4 ± 0.27 kg/m2 for 5 years and reported improvement in gastrointestinal (GI) symptoms, including stool passage. (23) Although their results confirm the general concept of the results of the present study, the use of different instruments to assess bowel habit limits comparison between studies. Potocznaand colleagues inspected 290 patients with severe obesity undergoing three surgical methods (AGB, RYGB, and BPD) for at least 4 months after surgery using a self-administered questionnaire and reported the highest weight loss in RYGB and improvement in constipation in all methods, except AGB. (5) One of the important limitations of the above-mentioned studies are lack of using a valid questionnaire for assessment of constipation, while WCS, used in the present study, is a valid instrument to assess constipation. Afsharand colleagues reported that frequency of bowel motions (SD) decreased from 8.6 (±3.5) to 5.7 (±3.5) motions/week (P = 0.001) and constipation increased from 8% to 27% after bariatric surgery without significant difference. However, they included nineteen RYGB, five sleeve gastrectomy and two intra-gastric balloon; (24) so, the results of cannot be compared because of investigating different surgical procedures. A Cross-Sectional study by El Labban revealed that constipation was significantly more frequent in patients who underwent SG compared to RYGB,(25) which is similar to the results of our study, although we studied OAGB and showed the greater efficacy of OAGB than RYGB on constipation. Yet, the results of the present study cannot easily be compared with previous research, because, different studies have used different scales and questionnaires, like WCS, Fecal Incontinence Severity Index (FSI),(21) Gastrointestinal Symptom Rating Scale (GSRS),(22) or other self-designed measurement tools.(5)

In addition to the differences in assessment tools, and difference in demographic characteristics of patients, such as mean BMI, different details of the procedures (laparoscopic vs. open RYGB), and different regimens before and after the surgery could be the reason for the diverse results among studies. As long as the exact etiology of higher prevalence of constipation in patients with obesity is unclear, the pure effect of different surgical methods can also not be evaluated easily. The differences in details of the procedures like the length of bypass limb and common channel can also play an important role in the patient's postoperative bowel habit. Hence, a meta-analysis to study the pure effect of each surgical method on constipation following bariatric surgery is recommended.

Since constipation is associated with dietary intake and supplements consumption, these factors should be controlled to measure the pure effect size of the gastric bypass on constipation. In addition, it is highly recommended to assess the impact of common channel length on postoperative constipation in future studies. As far as various aspects of this issue have to be elucidated, it is recommended future studies to evaluate a more precise prevalence, and etiology of constipation in patients with morbid obesity. All in all, this study, as the first to compare constipation between OAGB and RYGB, can give researchers and clinicians the primary perspectives towards this issue.

The present study indicated that patients with morbid obesity have a high frequency of constipation (44.7%) and obesity surgery reduced this frequency significantly. While postoperative diet and supplementary intake or other details may be different among patients, the present study, using one surgical technique for all patients, showed that along with significance BMI decrease in patients, OAGB could significantly reduce constipation score, while RYGB could not. As to the results of the present study, OAGB seems to be a better option for patients with morbid obesity who suffer from constipation, than RYGB. Considering the disturbing nature of constipation for the patient and several adverse consequences associated with constipation, future studies should focus on the prevalence and etiology of constipation and its change after bariatric surgery.

In the present study, the proportion of the patients involved with constipation reduced (from 48/103 to 32/103) significantly in OAGB group. Conversely, this decrease (from 58/134 to 57/134) in RYGB group was not statistically significant. The decreased constipation after OAGB is hypothesized to result from three mechanisms including malnutrition/ malabsorption, dumping syndrome and bile salt diarrhea. (26) Yet, the exact mechanism has to be further investigated. Also, in clinic, our patients were recommended to use multivitamin + minerals, and adhere to a specific diet regimen for the first month postoperatively that may also affect constipation, although the experience of the authors states that patients do not adhere to the recommendations.

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