Banded One Anastomosis Gastric Bypass versus Non-Banded One Anastomosis Gastric Bypass: A 3-year Prospective Cohort Study

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Background: The impact of band use in one anastomosis gastric bypass (OAGB) is uncertain. Limited evidence is available on how this approach enhance weight loss.

Patients and methods: Prospective cohort study was conducted to compare effectiveness of B_OAGB and OAGB regarding weight loss and resolution of Obesity related medical conditions. Patients were followed from December 2020 to June 2024. Eighty-seven patients were enrolled. 43 patients for B_OAGB and 44 patients for OAGB were analyzed, with a 3-year follow-up at the Ain Shams University Bariatric surgery department.

Results: The two groups' baseline characteristics were similar. There was a significant difference between both groups in operative time, B_OAGB took longer time (80.09 ± 10.18) minutes compared to OAGB (70.09 ± 10.52) minutes, p value ≤ 0.001. Between the two groups, there was no statistically significant difference in morbidity, death, or the resolution of Obesity related medical conditions. There was a significant difference in BMI between B_OAGB with and OAGB at 12, 24, and 36 months, B_OAGB showed lower BMI, p values were 0.001, 0.001 and ≤0.001 respectively.

Conclusion: Patients who received B_OAGB surgery lost more weight three years after surgery than those who did not have band. These findings imply that B_OAGB with a silicon ring was successful in sustaining weight loss and resolution of comorbidities over short to medium period with accepted rate of complications.

Key words: Banded OAGB, one-anastomosis gastric bypass, and weight reduction.

Introduction

The one anastomosis gastric bypass (OAGB) has emerged as a bariatric surgery several years ago, distinguished by its simplified surgical technique aiming to reduce operative time and potential morbidity compared to the Roux en Y gastric bypass (RYGB). Unlike the RYGB, OAGB involves a single anastomosis, specifically a single loop gastrojejunostomy positioned distantly from the duodeno-jejunal flexure, without involvement of enter enterostomy.[1,2]

Bands usage around the gastric pouch to enhance food intake restriction is recognized as a potential strategy to augment weight loss post RYGB, although it may lead to higher occurrences of food intolerance. Despite varied findings, studies generally suggest a minimal advantage of band implementation on long-term weight loss, especially among individuals whose BMI above 50.[1]

However, some research, such as that by Moon et al., indicates no significant benefits of band placement in RYGB and even reports some band-related morbidity.[3]

Clarke et al. and Sheikh et al. were pioneers in describing the use of silicone rings in one anastomosis gastric bypass, reporting significant weight reduction and resolution of co-morbidities associated with this approach.[4,5]

The impact of band use in OAGB remains uncertain, with limited evidence on its potential to enhance weight loss. Pilot studies, such as that by Miller et al., show promising results in terms of sustainable BMI reduction with Banded One Anastomosis Gastric Bypass (B-OAGB), but further long-term studies are needed to prove its efficacy.[6]

Similarly, while short-term studies like that by Cazzo et al. demonstrate higher early weight loss with B-OAGB, its impact on later outcomes requires further exploration through prospective comparative trials.[7]

Regardless of the band used, randomized research involving adults with Obesity demonstrated overall adequate weight loss following OAGB; throughout the course of the 1-year follow-up period, there were no appreciable changes in weight loss or vomiting between banded and non-banded OAGB.[1]

The aim of our study is to compare weight reduction outcomes and comorbidity occurrences after banded versus non banded OAGB over 12, 24, and 36 months.

Patients and methods

Study aim

The main aim of this prospective cohort study was to compare effect of B_OAGB and OAGB regarding weight loss and Obesity related medical conditions.

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Patients were followed from December 2020 to June 2024 at Ain Shams University Bariatric surgery department. Data of participants were collected then patients were followed up for 3 years. Decision of which surgery to be performed was a shared decision between multidisciplinary team The selection of the type of operation was a shared decision made between the the patients and surgical team , after they were informed about the cost of the band, expected benefits and complications .IRB approval was obtained.

Selection of patients

Patients were selected according to specific criteria.

Inclusion criteria were a body mass index (BMI) equal to or exceeding 40 kg/m², or a BMI equal to or exceeding 35 kg/m² alongside co-morbidities and obtaining a consent from patients. Only patients who completed a 3 year follow up were included.

Exclusion criteria were individuals from vulnerable groups, those with a history of previous bariatric surgeries, severe GERD, smokers, and alcohol consumption. Patients were between 18 and 65 years old.

Preoperative measures included comprehensive blood examinations, cardiology evaluation, and chest radiography were conducted to determine patient eligibility for bariatric surgery. The study protocol was approved by the ethical committees.

Laparoscopic surgery was used to accomplish the procedures. The two primary parts of the procedure were making a 15–18 cm gastric pouch with a 50–150 mL volume and performing a 3-cm loop antecolic stapler side–to–side gastrojejunostomy 200 cm away from the duodeno-jejunal flexure (biliopancreatic limb). Furthermore, a 6.5-cm silicone ring (Minimizer; Bariatric Solutions) was positioned around 4 cm above the gastroenterostomy.

Postoperative care: administering proton pump inhibitor (PPI) therapy. Patients were prescribed daily multivitamin supplements and placed on a fluid diet for 2-3 week. Most patients were discharged from the hospital within 1–2 days after surgery. Resolution of obesity related medical conditions was considered when: HbA1c <6.5 without medications in diabetic patients, blood pressure < 140/90 without medications in hypertensive patients, and in OSA: STOP BANG score < 3.

Data management and analysis:

1. Using the Statistical Package for Social Science (SPSS 25), the collected data was revised, coded, tabulated, and uploaded onto a PC. Data was displayed and appropriate analysis was carried out in accordance with the kind of data found for each parameter.

Descriptive statistics

a. Mean, Standard deviation (± SD) and range for parametric numerical data, while Median and Interquartile range (IQR) for non-parametric numerical data.

b. Frequency and percentage of non-numerical data.

2. Analytical statistics:

a. Independent t test: used to assess the statistical significance of the difference between two study group means.

b. Chi Squared test: used to assess the statistical significance of the difference between categories of each group.

P- value: level of significance.

-P>0.05: Non-significant (NS).

-P< 0.05: Significant (S).

A total of 87 individuals have been enrolled in the trial since December 2020. Two groups of patients were assigned: OAGB (n = 44) and B_OAGB (n = 43). **Table 1** illustrates that all baseline parameters were similar in the two groups: the mean age of the OAGB group without band was 38 ± 7, and the mean age of the group with band was 39 ± 8. The mean BMI of OAGB group was (46.5 ± 3.5 kg/M2), while the mean BMI of B_OAGB group was (48.2 ±3.9 kg/M2).

Comparison between the two groups about operative and postoperative events, there was a significant difference between both groups in operative time, OAGB with band took longer time (80.09 ± 10.18) compared to OAGB (70.09 ± 10.52), p value ≤ 0.001 as shown in Table 2. There was no statistical difference in morbidity (p value=0.623), and mortality between the two groups.

As shown in table 4, and figures 1,2, there was a significant difference in BMI between OAGB with and without band at 12, 24, and 36 months in BMI, B_OAGB showed lower BMI, p values were 0.001,0.001 and ≤0.001 respectively.

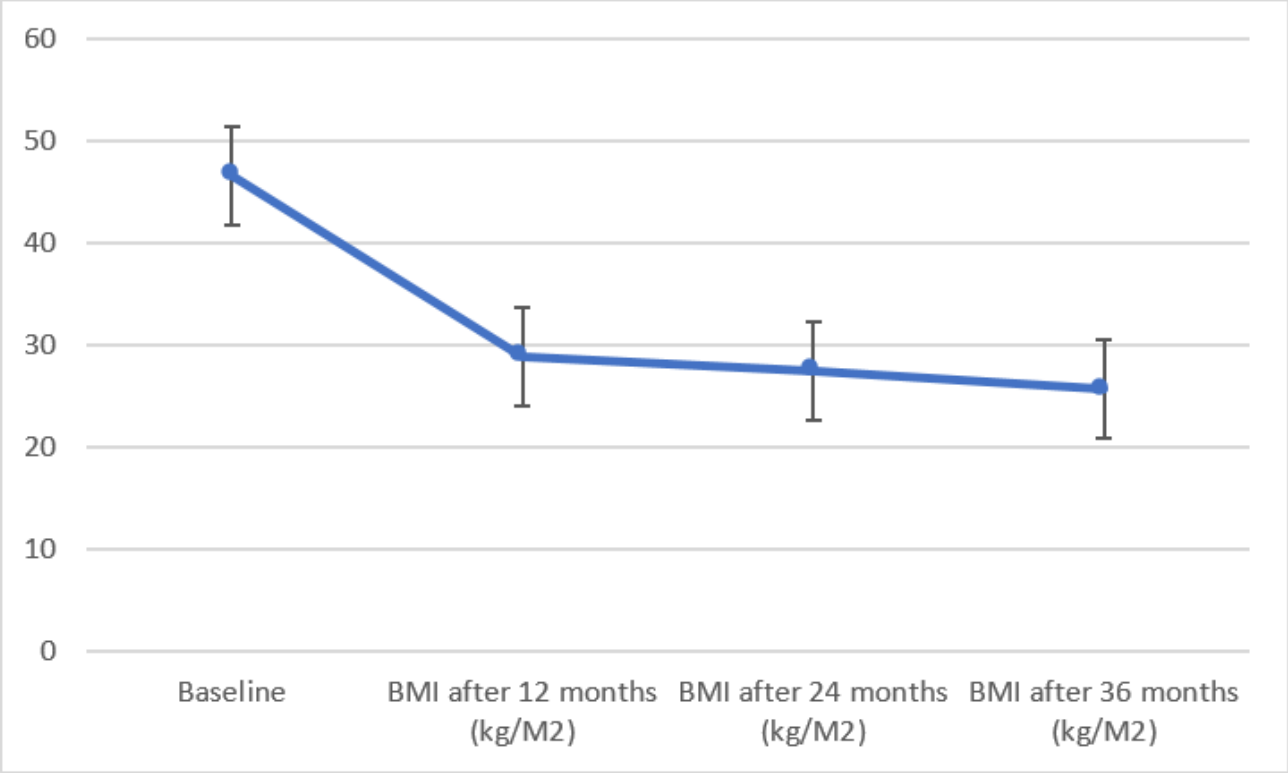

Fig 1: BMI change over time in OAGB.

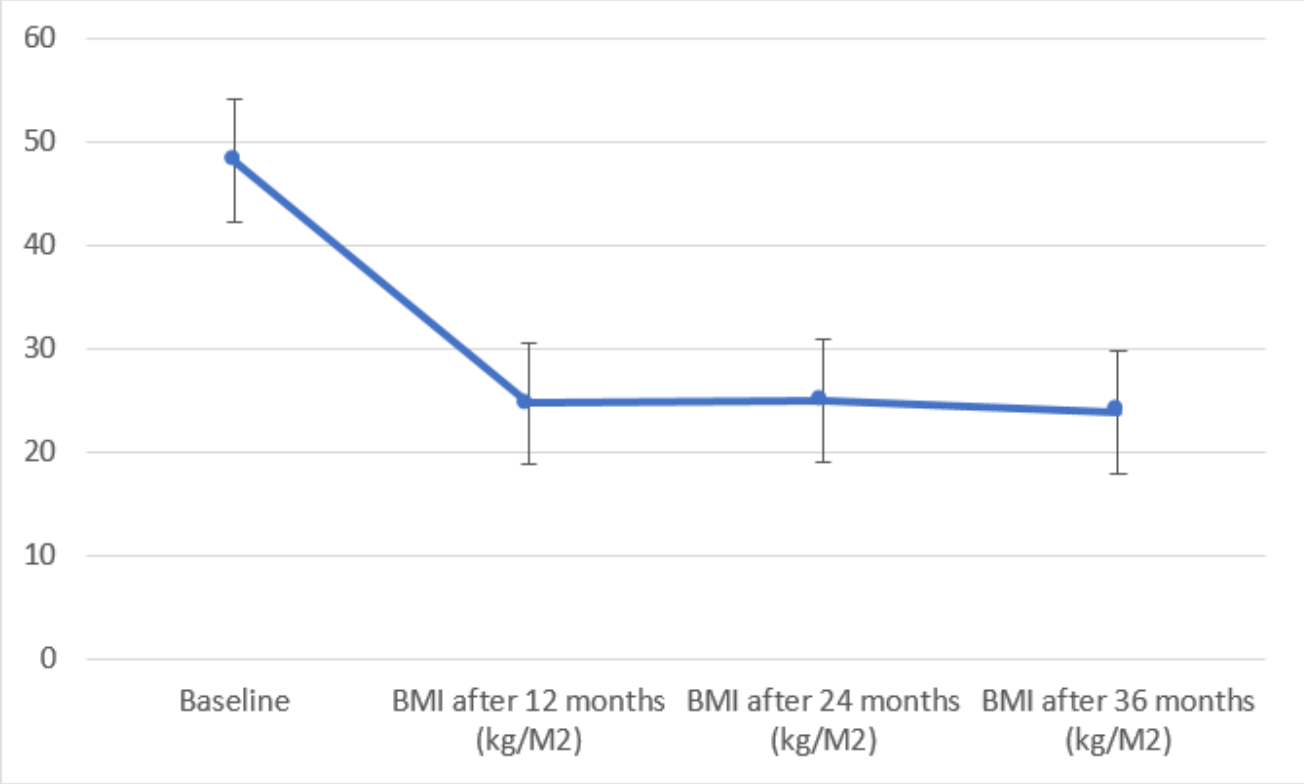

Fig 2: BMI change over time in B_OAGB.

Results

A total of 87 individuals have been enrolled in the trial since December 2020. Two groups of patients were assigned: OAGB (n = 44) and B_OAGB (n = 43). Table 1 illustrates that all baseline parameters were similar in the two groups: the mean age of the OAGB group without band was 38 ± 7, and the mean age of the group with band was 39 ± 8. The mean BMI of OAGB group was (46.5 ± 3.5 kg/M2), while the mean BMI of B_OAGB group was (48.2 ±3.9 kg/M2).

Comparison between the two groups about operative and postoperative events, there was a significant difference between both groups in operative time, OAGB with band took longer time (80.09 ± 10.18) compared to OAGB (70.09 ± 10.52), p value ≤ 0.001 as shown in Table 2. There was no statistical difference in morbidity (p value=0.623 between the two groups as shown in Table 3. In OAGB group; two patients (4.5%) had post operative reflux which was managed conservatively while in B_OAGB three patients (7%) had post operative reflux; Two of them were converted to RYGB. In B_OAGB group; two patients (4.7%) had band erosions; they underwent removal of the band and one patient underwent conversion to RYGB while the other underwent repair with omental patch. In OAGB group; two patients (4.7%) had a marginal ulcer which was managed conservatively while in B_OAGB; three patients (7%) had a marginal ulcer, one of them presented with interactable bleeding and managed by revision of gastrojejunostomy and conversion to RYGB. In OAGB group; two patients (4.7%) had post-operative bleeding which was managed conservatively while in B_OAGB; three patients (7%) had post-operative bleeding; one of them was managed conservatively, the second one presented with interactable bleeding and managed by rexploration by diagnostic laparoscopy and controlling of bleeding and the last one developed intraluminal bleeding which was managed by endoscopy and clipping.

There was no statistical difference in Resolution of comorbidities (p value=0.589) between the two groups as shown in Table 4.

As shown in table 5, and figures 1,2, there was a significant difference in BMI between OAGB with and without band at 12, 24, and 36 months in BMI, B_OAGB showed lower BMI, p values were 0.001,0.001 and ≤0.001 respectively.

Table 1: Descriptive characteristics of study participants

Mean ± SD Count (%)		OAGB (n=44) Mean ± SD Count (%)	B_OAGB (n=43)	Test value	p value
Age		38 ± 7	39 ± 8	-0.90	0.368
Sex	Male	14 (31.8%)	9 (20.9%)	1.33	0.250
	Female	30(68.2%)	34 (79.1%)		
BMI (kg/M2)		46.5 ± 3.5	48.2 ±3.9	-2.91	**0.051**
DM	No	28 (63.6%)	25 (58.1%)	0.09	0.762
	Yes	16 (36.4%)	18 (41.9%)		
HTN	No	30 (68.2%)	28 (65.1%)	2	0.157
	Yes	14 (31.8%)	15 (34.9%)		
Sleep apnea	No	42 (95.5%)	43 (100%)		0.494
	Yes	2 (4.5%)	0		

*OAGB: One anastomosis gastric bypass, BMI: Body mass index, DM: Diabetes mellitus, HTN: Hypertension.

Table 2: Description of operative & postoperative events

Mean ± SD Count (%)		OAGB (n=44) Mean ± SD Count (%)	B_OAGB (n=43)	Test value	p value
Operative time (minutes)		70.09 ± 10.52	80.09 ± 10.18	-4.505	**≤0.001**
Mortality	No	44 (100%)	43 (100%)		
	Yes	0	0		

PPI: proton pump inhibitor, RTI: respiratory tract infection, SSI: Surgical site infection.

Table 3: Distribution of short- and long-term outcomes

			OAGB (n=44)	B_OAGB (n=43)	Test value	p value
			Mean ± SD	Mean ± SD		
			Count (%)	Count (%)		
Morbidity	30 days outcomes	Bleeding	2 (4.5%)	3 (7)%	7.02	0.623
		RTI	2 (4.5%)	3 (7%)		
		SSI	2 (4.5%)	1 (2.3%)		
	Long term outcomes	Reflux	2 (4.5%)	3 (7%)		
		Band Erosion	0	2 (4.7%)		
		Iron deficiency anemia	4 (9%)	3 (7%)		
		Marginal ulcer	2 (4.5%)	3 (7%)		
		Unsatisfactory weight loss	2 (4.5%)	0		

Table 4: Resolution of Obesity related medical conditions

			OAGB (n=44)	B_OAGB (n=43)
Resolution of Obesity related medical conditions.	DM	No	2 (66.7%)	1 (33.3%)
		Yes	10 (52.6%)	9 (47.4%)
		Partial resolution	4 (44.4%)	5 (55.6%)
	HTN	No	0	
		Yes	11 (55%)	9 (45%)
		Partial resolution	3 (42.9%)	4 (57.1%)
	Sleep apnea	No	0	0
		Yes	2 (100%)	0
		Partial resolution	0	0

Table 5: Difference between OAGB with and without band in BMI

	OAGB (n=44)	B_OAGB (n=43)	Test value	p value
	Mean ± SD	Mean ± SD		
	Count (%)	Count (%)		
BMI after 12 months (kg/M2)	28.86 ± 1.94	24.70 ± 1.37	3.311	**0.001**
BMI after 24 months (kg/M2)	27.47 ± 2	25.05 ± 0.97	3.496	**0.001**
BMI after 36 months (kg/M2)	25.64 ± 1.12	23.83 ± 1.56	4.358	**≤0.001**

BMI: Body mass index.

Discussion

There is currently no agreement on the impact of utilizing a silicone ring on weight reduction outcomes in bariatric surgery. For instance, in a study conducted by Magro et al. reported an excess weight loss (%EWL) of 79.7% and a percent BMI loss (%BMIL) of 30.8% among individuals with morbid obesity who underwent banded RYGB. Heneghan et al. also observed improved weight reduction following banded RYGB, particularly among individuals whose BMI above 50, coupled with a low incidence of band-related complications. In contrast, Lemmens did not identify significant differences in early weight loss; however, individuals who underwent banded RYGB demonstrated superior weight reduction.[3,8,9]

According to the current study, the use of a band in OAGB led to a considerably greater loss in weight at 12, 24, and 36 months compared to the usual procedure. In contrast to this investigation, a randomized study assessing thirty-three patients with severe obesity, in which banded (16 cases) and non-banded (17 cases) OAGB procedures were carried out, concluded that the standard technique was still superior to the use of a band in OAGB in terms of weight reduction at six and twelve months. But a preliminary report from this experiment showed that at three months, there was a substantial difference between banded and non-banded OAGB.[1] In another trial that ran from October 2013 to February 2014, B_OAGB was performed on a pilot cohort of 12 patients (mean baseline BMI 57.5 ± 6.3). BOAGB was proven to be safe and beneficial for helping obese people lose weight and resolve Obesity related medical conditions at the 5-year follow-up.[6]

Another study conducted by Fouly et al., from June 2018 to June 2021, medical records of patients from the Bariatric Surgery Department who underwent either OAGB or B_OAGB were reviewed. After 3 years of follow-up, patients showed no significant difference in BMI loss between OAGB and B-OAGB at 12 months (OAGB: 29.4 ± 2.4 vs. B-OAGB: 28.4 ± 2.6, P=0.14) and 36 months (OAGB: 24.7 ± 2.2 vs. B-OAGB: 24.2 ± 2.1, P=0.34), respectively. However, a significantly lower BMI was detected in the B-OAGB group at 24 months of follow-up (OAGB: 24.8 ± 1.3 vs. B-OAGB: 26 ± 2.2, P=0.01).[10]

Like the present study, in a study conducted by Fouly et al., there was no significant difference between both operations in the resolution of preoperative Obesity related medical conditions or postoperative complications.[10]

The evidence supporting the use of bands in OAGB patients, however, is still less clear. Although it was linked to bile reflux and marginal ulcers in 10.3%, and 7.7% of patients respectively, by Clarke et al. reported an outstanding 5-year %EWL of 89%. A continuation of this study was published by Sheikh et al. years later. They found that the mean 11-year EWL was 84.3%, and that 9.4% of patients needed to convert to RYGB because of reflux. In our study; in B_OAGB group three patients (7%) had post operative reflux; two of them were converted to RYGB. Two patients (4.7%) had band erosions; they underwent removal of the band and one patient underwent conversion to RYGB while the other underwent repair with omental patch. Also three patients (7%) had a marginal ulcer, one of them presented with interactable bleeding and managed by revision of gastrojejunostomy and conversion to RYGB.[4,5]

In our study B-OAGB took a longer time (80.09 ± 10.18 minutes) compared to OAGB without a band (70.09 ± 10.52 minutes), with a p-value of ≤ 0.001. Like the present study, in a study conducted by Fouly et al., the overall mean operative time was significantly higher in the BOAGB group compared with OAGB (mean 79.4 ± 11.1 vs. 68.8 ± 9.3 minutes, respectively).[10]

In summary, patients who had B_OAGB surgery sustained better weight loss three years after surgery than the non-banded group. These findings imply that long-term weight loss following laparoscopic B_OAGB with a silicon ring was feasible with a accepted rate of complications.

A bigger sample size is required to identify any potentially more subtle changes between and within these two groups, as this study has significant limitations. Furthermore, the study's 3-year follow-up period was too short; a longer follow-up period is required.

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