

## Assessment of Laparoscopic Mini-Gastric Bypass (LMGB) as A Treatment for Failed Vertical Band Gastroplasty (VBG); Safety and Outcome

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### Abstract

**Background:** Bariatric surgery is one of the most successful methods for sustained weight loss in morbid obese patients. Despite the initial success of Vertical Band Gastroplasty (VBG) 10-25% of patients will require re-operation for unsatisfactory results. Re-operation carries the risk of high morbidity and mortality. The Laparoscopic Mini-Gastric Bypass (LMGB) for revision of failed VBG will be evaluated in this study.

**Methods:** Between January 2015 and March 2017 in Ain Shams University Hospitals 50 patients with failed VBG were enrolled in this prospective study evaluating LMGB as an option for revision.

**Results:** In our study 50 patients underwent LMGB for revision of failed open VBG, the incidence of intra-operative complications was 6% and post operative complications was 22% with significant improvement of BMI after one year of the operation and marked improvement of other symptoms of failure.

**Conclusion:** At our study LMGB appears to be a safe and sound option as a revisional surgery after open VBG with satisfactory weight loss and less incidence of complications.

**Key Words:** Mini-gastric bypass – Vertical band gastroplasty – Revision – Morbid obesity.

### Introduction

**OBESITY** has become one of the most important health issues in developing and developed countries, with dramatic increase over the last decades [1]. Morbid obesity is associated with serious co-morbidities, such as type 2 diabetes, hypertension, arthritis, and sleep apnea, which cause an estimated 6 to 12 times greater mortality rate than the normal populations [2]. In the past few years, Vertical Band Gastroplasty (VBG) gained worldwide popularity for the treatment of morbid obesity and was found to be effective in achieving weight loss as

well as resolution of co-morbidities with low operative risk [3]. However, in the following years the operation did not achieve optimum results as it was associated with long-term weight gain and some mechanical complications. Later, long-term studies have reported that the rate of conversion surgeries after open VBG ranged from 49.7 to 56% [4,5]. Laparoscopic techniques have greatly increased, and laparoscopic bariatric surgery has been shown to be safe and an effective alternative to open operations. Many investigators have performed RYGBP for redo bariatric surgery either in open or laparoscopic fashion [6]. The Laparoscopic Mini-Gastric Bypass (LMGB), first reported by Rutledge, is a procedure employing a divided long vertical tube gastroplasty in conjunction with a loop gastrojejunal bypass, which causes weight loss by both restriction and malabsorption [7]. The purpose of this study was to evaluate LMGB as a re-do surgery for patients with failed VBG, with special emphasis on operative and post-operative outcome.

### Patients and Methods

Between January 2015 and March 2017, 50 patients were scheduled for revisional surgery after failed VBG (causes of failure are shown in (Table 2) in Ain Shams University Hospitals, 46 females and 4 males with mean age  $36.32 \pm 8.72$  with mean Body Mass Index (BMI) before LMGB  $42.84 \pm 7.34$  (Table 1).

All 50 patients underwent complete pre-operative work-up, including full blood chemistry, endocrine status, upper gastrointestinal barium studies, and gastroendoscopy. Visits to a dietician and psychiatric evaluations were arranged, and explanations for a clear understanding of the ben-

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efits, risks, and long-term consequences of a mal-absorptive procedure were done.

Table (1): Demographic data of the patients.

	Total no.=50
<i>Age:</i>	
Mean $\pm$ SD	36.32 $\pm$ 8.72
Range	22-56
<i>Sex:</i>	
Female	46 (92.0%)
Male	4 (8.0%)
<i>BMI before VBG:</i>	
Mean $\pm$ SD	46.87 $\pm$ 8.94
Range	35-70
<i>BMI before MGB:</i>	
Mean $\pm$ SD	42.84 $\pm$ 7.34
Range	34-62

Table (2): Cause of failure of previous VBG.

Reasons for revision to LMGB	No. of cases
Weight regain	19 (38%)
Unsatisfactory weight loss	17 (34%)
Reflux esophagitis	11 (22%)
Stomal stenosis	3 (6%)

The LMGBs were essentially the same as described by Rutledge [7]. The patients were placed in gentle reverse Trendelenburg position, and 5-trocars were used (one for the camera, two working ports, one assistant port and one port for liver retractor).

We started each operation by performing a diagnostic laparoscopy and division of adhesions from the previous operation with achieving a full view and orientation of the needed anatomy.

Dissection along the lesser curvature was limited to the distal part of the stomach adjacent to the crows foot, to avoid injury to the blood supply of the gastric tube. Narrow gastric tube, roughly the diameter of the esophagus, was created using the GIA stapler after insertion of a 36-Fr tube as a stent. The retro-gastric space was dissected progressively after each linear stapler application under direct vision up to the angle of his and just medial to the previous VBG staple line to decrease the size of the dilated gastric pouch if needed, avoiding injury to the posterior gastric wall.

The small intestine was then explored and the ligament of Tritz was identified with the creation of an anti colic gastro jejunostomy 200cm from the ligament of Tritz, closure of the stoma was done using V-Lock endo-stitch sutures and mythe-

lene blue test was done twice in all our patients any bleeding point from the staple line was secured using a hemo clips.

A drain was left for the first 48 hours no ryle tube nor urinary catheter was needed. All patients were followed-up for any complications in the early post-operative period and were followed-up at 3, 6 and 12 months for weight loss.

## Results

In this study all the operations were completed laparoscopically except for two patients, which were converted to open surgery due to extensive adhesions in one case and uncontrolled intra operative bleeding in another case, mean operative time was 95 $\pm$ 17.3min in the patients completed laparoscopically, all patients were discharged on post-operative day 2 after starting oral intake for 48 hours except for five patients for management of encountered complications.

As regard intra operative complications shown in (Table 3) we had one patient with injury to the splenic vessels with subsequent conversion to open surgery with control of the bleeding and splenectomy with completion of the operation and also another patient with extensive adhesions. Both patient were calculated statistically for weight loss in this study.

During the early post-operative period 3 patients (6%) had bleeding evident by  $\pm$ 300cc blood in the drain and hemodynamic instability, they were managed conservatively by blood transfusion and were discharged after staplization and follow-up CBC. 2 patients had post-operative leakage diagnosed by post-operative CT scan with oral contrast and were managed by placing anti migratory mega stent endoscopically which was removed 6 weeks later with no need for re operation. One month after the operation 6 patients (12%) started complaining of symptoms of reflux 5 patients were managed medically with complete resolution at 7 $\pm$ 2 weeks and 1 patient was scheduled for conversion to LRYGB after failure of medical treatment post-operative complications shown in (Table 4).

As regard weight loss our study showed highly significant improvement of BMI along follow-up at 3, 6 and 12 months shown in (Table 5) also patients were subjected for a questionnaire for resolution of symptoms of other causes of failure with complete resolution after 6 months of the operation.

Table (3): Intra operative complications.

Intra operative complications	No.	%
<i>Bleeding:</i>		
Negative	49	98.0
Positive	1	2.0
<i>Internal organs injury:</i>		
Negative	50	100.0
Positive	0	0.0
<i>Conversion to open:</i>		
Negative	48	96.0
Positive	2	4.0

Table (4): Post-operative complications.

Post-operative complications	No.	%
<i>Bleeding:</i>		
Negative	45	90.0
Positive	3	6.0
<i>Leakage:</i>		
Negative	48	96.0
Positive	2	40.0
<i>Reflux gastritis:</i>		
Negative	44	88.0
Positive	6	12.0

Table (5): BMI before LMGB and on follow-up.

	Mean ± SD	Range	Test value*	p-value	Sig.
• BMI before MGB	42.84±7.34	34-62	–	–	–
• Post-operative weight loss after 3 months	37.97±5.74	31-50	16.799	0.000	HS
• Post-operative weight loss after 6 months	34.04±4.67	28-45	17.085	0.000	HS
• Post-operative weight loss after 1 year	29.22±3.57	24-37	23.779	0.000	HS

p-value >0.05: Non significant. p-value <0.01: Highly significant.  
 p-value <0.05: Significant. •: Paired t-test.

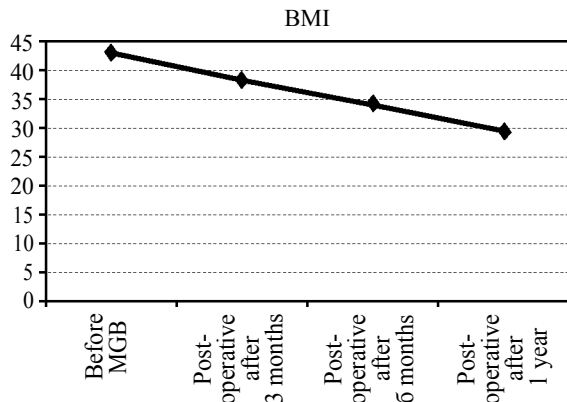


Chart (1): Showing BMI during follow-up.

**Discussion**

In the past two decades, VBG was one of the most popular bariatric operations, and was endorsed by the NIH in 1991 because of its technical simplicity, safety and good results [8]. Nevertheless, several reports on long-term follow-up found that VBGs may be associated with long-term failure. Van Gemert et al., [9] reported a failure-rate after VBG of 56% over a period of 12 years, and more recently, Ortega et al., [10] reported a failure-rate of 50% after only 2-years follow-up. Over the past years, LRYGB was the most commonly performed conversion surgery after failed open VBG as it achieves good long-term results in weight loss. However, it is associated with a high rate of complications and long-term metabolic side effects [4]. It has been reported that revisional bariatric surgery is burdened by high morbidity rates ranging from 12-50% [11]. Yet in our study the incidence of intra and post-operative complications were 6% and 22% respectively and most of them were managed conservatively. Developments made in laparoscopic revisional bariatric surgeries led to the arising of LMGB as a safer substitute to LRYBG, LMGB is superior in the fact that it is associated with single anastomosis with better blood supply for gastric tube decreasing the risk of leakage [12]. In 2005 Gonzalez et al., [13], stated that anastomotic strictures and leaks are relatively high after revisional LRYGB. Later, Gagne et al., [14] stated that strictures are common complication after revisional LRYGB and it occurs because of proximal gastric pouch mucosal thickening or distal pouch ischemia due to chronic inflammation from vertical staple line. So in conclusion LMGB appears to be a safe option for revisional surgery with excellent weight loss and accepted improvement in other causes of failure of VBG.

*Conclusion:*

By the end of our study we believe that LMGB is a safe and sound option for revision of failed open VBG in terms of safety and weight loss.

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## تقييم عملية تحويل المسار المصغر بالمنظار كعلاج لفشل عملية تدبيس المعدة من حيث النتائج والأمان

جراحة السمنة هي واحدة من أنجح الطرق لفقدان الوزن في المرضى الذين يعانون من السمنة المفرطة. على الرغم من النجاح المبدئي في جراحة تدبيس المعدة فإن ١٠-٢٥٪ من المرضى سيحتاجون إلى إعادة إصلاح للحصول على نتائج مرضية. تنطوي إعادة الإصلاح على مخاطر ارتفاع معدلات المضاعفات والوفيات. سيتم تقييم تحويل المسار المصغر بالمنظار لمراجعة فشل عملية تدبيس المعدة في هذه الدراسة.

بين يناير ٢٠١٥ ومارس ٢٠١٧ في مستشفيات جامعة عين شمس تم تسجيل ٥٠ مريضاً يعانون من فشل عملية تدبيس المعدة، في هذه الدراسة المستقبلية سوف يتم تقييم عملية تحويل المسار المصغر كخيار لإصلاح فشل الجراحة السابقة.

النتائج، في دراستنا خضع ٥٠ مريضاً لعملية تحريل المسار المصغر بالمنظار بعد فشل جراحة تدبيس المعدة، وكان معدل حدوث المضاعفات داخل العمليات ٦٪ ومضاعفات ما بعد الجراحة كان ٢٢٪ مع تحسن كبير في مؤشر كتلة الجسم بعد عام واحد من العملية والتحسين الملحوظ من الأعراض الأخرى المسببة للفشل.

الإستنتاج، في دراستنا وجد أن جراحة تحويل المسار المصغر بالمنظار تعد خيار آمن وسليم كجراحة إصلاح بعد فشل عملية تدبيس المعدة مع فقدان الوزن بنسبة مرضية وحدث أقل للمضاعفات.