OUTCOME OF MINI GASTRIC BYPASS AFTER FAILED VERTICAL BAND GASTROPLASTY IN TREATMENT OF MORBID OBESE PATIENTS

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ABSTRACT:

Background: *Bariatric surgery has long been introduced for weight control if conservative treatment failed and was widely accepted in the past decades. Compared with nonsurgical strategies, bariatric surgery proves more effectiveness for moderately to severely obese people to lose weight. Besides, bariatric surgery was demonstrated to induce significant and long-term remission of obesity related comorbidities.*

Aim of The Work: *The aim of this study to review the outcome of Mini gastric bypass as a line of management of failed VBG operation in treatment of morbid obese patients as regard weight loos, intraoperative complications, postoperative complications and other comorbidities within one year follow up after operation.*

Patients and Methods: *Our study includes thirty (30) morbidly obese patients who fulfilled the criteria for bariatric surgery with BMI >40 or >35 with associated co-morbidities with failure of previous restrictive operation (VBG). These patients were enrolled in a prospective study and had a retrospectively gathered outcome analysis at the department of surgery Ain-Shams University Hospitals. Our study was conducted in El-Demerdash hospital, Ain- Shams University. Thirty patients were selected and operated upon from June 2017 till June 2019 and followed up to June 2020.*

Results: *In our study causes of revision in (30) patients: weight regain (10) patients severe GERD (9) patients, un satisfactory weight loss (8) patients, eating difficulties (3) patients. In our study The mean initial BMI for the patients was The preoperative BMI with mean ± SD: 42.9 ± 7.21 kg/m^2, was higher than post-operative BMI at 3 months with mean ± SD value of 38.03± 5.62 kg/m^2), than post-operative BMI at 6 months with mean ± SD value of 33.98 ± 4.58 kg/m^2, than post-operative BMI at 12 months with mean ± SD value of 29.22 ± 3.60 kg/m^2.*

Conclusion: *Mini-gastric bypass offers major benefits with quite satisfactory results over most alternative procedures. Our data, which includes follow up of two years, indicates that mini gastric bypass is: An effective procedure for the treatment of failed restrictive procedure (VBG). Technically feasible. Safe operation with a low rate of major postoperative complications. Has a significant reduction in patient's hospital stay. Helps in the achievement of a significant weight loss and improvement of obesity related metabolic co morbidities. Efficient in loosing excess weight and in maintaining the weight loss. so it is*

considered a promising revisional bariatric procedure operation for patients with failed prior open or laparoscopic VBG

Keywords: *Vertical banded gastroplasty, laparoscopic mini-gastric bypass*

INTRODUCTION:

Obesity is defined as abnormal or excessive fat accumulation that may impair health and studies suggest that without intervention reversal of obesity is uncommon. The most commonly used measure for classifying obesity is the body mass index (BMI), calculated as body weight in kilograms divided by height in meteres squared (kg/m^2). In adults a desirable BMI is between 18.5 to 25 and overweight is between 25 to 30. Obesity is defined as BMI over 30, while severe or morbid obesity is defined as BMI over 40.**(1)**

Obesity is a chronic disease that impairs health-related quality of life in adolescents and children. In 2010, overweight and obesity were estimated to cause 3.4 million deaths, 3.9% of years of life loss, and 3.8% of disability-adjusted life-years worldwide[(2)].

Chronic diseases as the predominant death cause are well established, and obesity, being one of the factors strongly contributive to chronic diseases, has being consistently threatening the global health. Obesity leads to multiple comorbidities including hypertension, hyperlipidemia, and hyperglycemia whereas weight loss is associated with reduced metabolic and cardiovascular risks[(3)].

An increasing number of bariatric procedures are performed each year, and the number of patients requiring revision procedures is also increasing.

Vertical banded gastroplasty (VBG) used to be a common restrictive bariatric procedure in the 1990s, but nowadays it is out from the bariatric Surgeons' repertoire due to its late complications (band erosion and stenosis) and insufficient long-term weight loss[(4)].

Laparoscopic mini-gastric bypass (LMGBP), first reported by Rutledge, was proposed as a simple and effective treatment of morbid obesity[(5)].

At the same time, this procedure has its own unique advantages. It is an attractive bariatric procedure compared to the gold standard Roux-en-Y gastric bypass (RYGB) with one less anastomosis. Many thousands of these procedures have now been performed by different surgeons who believe it is a better alternative to RYGB due to shorter operative time, fewer sites for anastomotic leaks and internal herniation, shorter learning curve, ease of reversibility and revision with equivalent results in terms of weight loss and co-morbidity resolution[(6)].

The operation consists primarily of a long linear lesser-curvature gastric tube with gastroenterostomy 180–200 cm distal to the duodenojejunal junction (Ligament of Treitz). It has rightly been described as a modification of Mason's loop gastric bypass, but with a longer lesser curvature tube[(7)].

The technique used for LMGBP was a 5-port technique similar to that described by Rutledge. A long gastric tube was created using an EndoGIA stapler approximately 1.5 cm to the left of the lesser curvature from the antrum to the angle of His. A loop gastroenterostomy was created with the small bowel about 200 cm distal to the ligament of Trietz with an Endo-GIA stapler. The gastroenterostomy was then closed with continuous suture. One tube drain was left in the lesser sac before closure of the wound.[(8)]

PATIENTS AND METHODS;

Morbidly obese patients who fulfilled the criteria for bariatric revisional surgery e.g., BMI >35 kg/m^2 with a history of failed VBG more than two years.

These patients were enrolled in a prospective study starting from June 2017 to June 2019. The study were conducted at Ain Shams University hospital.

A comprehensive assessment program was carefully structured so that a disciplined routine is followed in each patient. All patients were preoperatively evaluated with provision of extensive information.

Inclusion criteria:

Individuals diagnosed to be morbidly obese with the following criteria: Patients ranging from age of 20-65 years old. BMI >35. Patient underwent VBG operation with the following criteria: Failed to lose weight after the operation. Regain weight after initial weight loos. Long term complication (persistent vomiting, electrolyte disturbance, anemia and GERD).

Exclusion criteria:

Patients below age of 20 years and over 65 years. Uncontrolled psychiatric disease. Alcohol or drug abuse. GI inflammatory diseases. Pregnancy. Cancer history > 5 years. Renal and liver failure. Serious cardiovascular complications. Patient who was unable to participate in prolonged medical follow up.

The documented preoperative, operative and postoperative follow up data for all patients were collected and reviewed and the outcome of surgery was evaluated.

Patients were subjected to preoperative assessment which included:

Age and gender.

Full clinical assessment: ***Full medical history with special notes on:*** Detailed operative history of previous VBG (laparoscopic or open), timing of operation, pre VBG weight and post VBG weight, causes of revision. Associated comorbidities: sleep apnea and obesity related back pain, ischaemic heart disease, diabetes type II, HTN or Dyslipidemia. Weight loss trials, Eating habits, Psychological status,

Full clinical examination including BMI and body circumferences.

Full laboratory investigations: Complete blood picture, Liver function tests, kidney function tests, Lipid profile, Thyroid profile, Hemoglobin A_1C,

Patient was described as diabetic if fasting blood sugar was 126 mg/dl or above or two hours postprandial blood sugar was 200 mg/dl or above or random blood sugar was 200 mg/dl or above.

Pulmonary function test:

Radiological imaging: Plain X-Ray chest, Abdominal ultrasonography (to exclude chronic calcular cholecystitis). Gastrograffin meal: was done to measure pouch size, exclude gastro gastric fistula, stomal stenosis, staple line disruption. Virtual gastroscopy with 3D reconstruction.

All cases will be operated by consultant surgeon and according to the standardized technique.

The management prior to bariatric surgery aims to ensure: The patients were **well informed** regarding the realistic expected outcomes in terms of weight change, and effect on co-morbidities as well as the risks of complications. That the patients' **co-morbidities** were optimized in order to minimize the risk of the surgical procedure. That the patient was **well informed** regarding necessary postoperative adherence to dietary recommendations/ restrictions as well as to other parts of the follow-up. That the patient was **motivated and willing** to adhere to dietary

recommendations/restrictions as well as to other parts of the follow-up. The patient enters the hospital 1 day preoperatively after the fulfillment of the investigations for the anaesthetic assessment.

Post-operative follow up:

The follow up period of one year was carried out on an outpatient basis: Weekly visit for one month after discharge from the hospital, Monthly visit till the end of the third month, Visit every three months till the end of the first year. In each visit patient had: Full clinical assessment, Measurement of the anthropometric measures, Required investigations according to the patient's condition. Diagnostic upper GIT endoscopy was done for patients with upper GIT symptoms like heartburn, regurgitation, dysphagia, dyspepsia or vomiting to examine pouch and stomal openings for any inflammatory signs or stomal ulcers, and specimens were taken for histo-pathological examination.

Post-operative diet regimen:

Patients were instructed to follow up four stages diet regimen (each is one week) under supervision of the nutritionists as follow: **The first stage** started when the patient started oral fluids in the form of clear fluids for the end of 1st week. **The second stage** started in the second week post operatively in the form of protein rich fluids. **The third stage** started in the 3rd week post operatively in the form of pureed diet. **The fourth stage** started in the 4th week post operatively in the form of low calorie soft diet.

By the end of 4th week postoperatively patient will start low fat diet

Post-operative drug therapy: **On discharge,** patients were instructed to receive oral treatment in the form of broad spectrum antibiotic, analgesic and proton pump inhibitor for one week. **In the second stage,** patients continued to receive the proton pump inhibitor and started to receive oral vitamin B_{12}. **In the third stage,** patients started to receive oral calcium together with vitamin D in addition to previous medication. **In the fourth stage,** patients continued on the same treatment and started to receive oral iron supplement to continue on that treatment for the next three months.

Operative Technique:

We performed laparoscopic MGB after VBG in case of conversion to open MGB the abdomen is entered through previous scar (upper midline mini laparotomy), incase of laparoscopic MGB: Creation of pneumo-peritoneum using Verrus needle. Ports placement and liver retraction by self-retaining liver retractor. Creation of the gastric pouch using linear staplers. Exposure of the duodeno-jejunal junction. The gastro-jejunal anastomosis.

Procedure:

Preoperative medications: One gram of IV antibiotics(third generation cephalosporin) H_2-blocker. Anti-emetic.

Anesthesia: General endotracheal anesthesia with muscle relaxant was used for all patients.

Position of the patient: Patients were put in supine position and brought into a reverse Trendelenburg position with extended arms and the patients were secured to the table using adhesive strips. All contact zones were checked and padded to avoid nerve and arterial compression and pressure sores. Nasogastric tube was inserted into the stomach body, self-retaining urinary catheter in the urethra and elastic stockings around legs up to the knees to avoid intra-operative DVT. The surgeon between patient legs and the assistant to the left while the camera man stood on the rt side of the patient with the monitor placed above the patient's left shoulder.

Steps of surgery:

Creation of pneumo-peritoneum (figure 1): After creation of 14-18 mmHg

carbon dioxide pneumo-peritoneum using Verrus needle technique the needle was inserted in, beneath the left rib arc, in the midclavicular line, just beside the arc itself. Verrus needle is, in this manner, introduced in the abdominal cavity in a rather safe position, where the rib arc is convex and therefore the possibility of organ injury is minimal. Nevertheless, injuries of the spleen, liver, stomach, colon and omentum are still possible, cannulas were placed through which surgical instruments and staplers were introduced.

Figure (1): Creation of pneumo peritoneum using verrus needle.

Ports placement and liver retraction (figure 2):

The pneumoperitoneum is performed by means of a direct puncture with a Veress needle in the left upper quadrant, near the costal margin at the level of the midclavicular line (Palmer's point).

The initial pressure is set at 15 mmHg, and maintained till the expected pressure (about 15 mmHg) is reached. The surgery initiates by the placement of the 10 mm permanent trocars for introduction of 30 degrees optics/camera placed at the mesogastrium between 12-15 cm below the xiphoid process and 3 cm to the left of the midline, considered as number 1 trocar. The trocar number 2, of 5 mm, is placed near the xiphoid process for the use of liver retractor which is usually a stick/probe held by the 2nd assistant. The number 3, disposable of 12 mm, is used by the surgeon's left hand, placed on the right side of the patient in an intermediate position between the previous two, 3-5 cm lateral to the midline. The number 4, also permanent of 5 mm, is placed along the left costal margin in the anterior axillary line to the 1st assistant. The last trocar, number 5, disposable of 12 mm, is placed adjacent to the left costal margin in the hemi-clavicular line to surgeon's right hand manipulation. The pneumoperitoneum is maintained by trocar number 5. Figure 2.

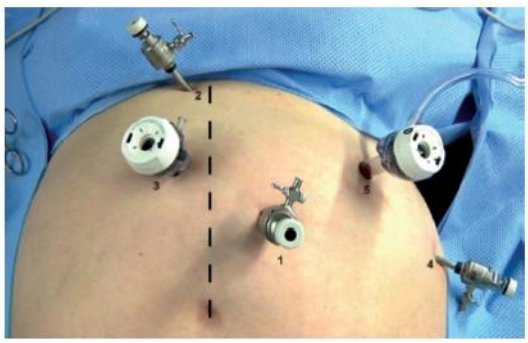

Figure (2): Placement of the trocars.

The procedure began by exploration of the abdominal cavity, with particular attention to potential adhesions, mobility of the omentum and length of small intestine mesentery, checking out the position of nasogastric tube and emptying the stomach.

Figure (3): Dissection of adhesion between omentum and ant abdominal wall

Creation of the gastric pouch (figure 4-10):

Once the operation field has been prepared, we identified the gastro-esophageal junction and marked a point between the 2nd and the 3rd gastric vessels as close as possible to the gastric serosa the anterior surface of the stomach is dissected free from the left lobe of liver then Dissection was performed over the lesser omentum to enter the lesser sac just proximal to antrum, and the 36 Fr bougie was introduced as a guide and stent for creating the gastric tube, along the lesser curvature

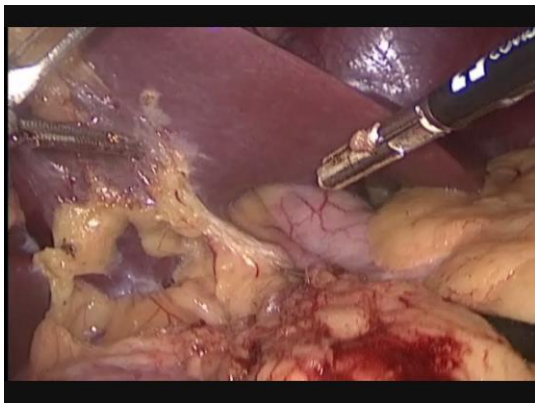

Figure (4): Dissection stomach from the liver.

Subsequently a tunnel behind the posterior gastric wall is created, the harmonic scalpel^{R} or ligasure was used to incise the hepato-gastric ligament.

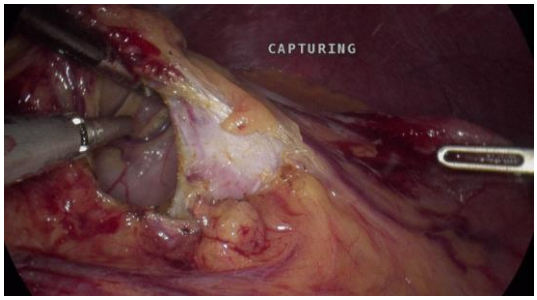

Figure (5): Creation of a tunnel behind the post gastric wall.

Once the posterior wall of the stomach was exposed and identification of the mesh done we introduced a 60 mm Endo GIA^{R} black tri stapler cartridge Designed for extra thick, dense tissues commonly found in challenging bariatric procedures such as

revisions and Provides a smooth firing force through extra thick tissue due to stronger knife bar, higher compression force and improved firing mechanism Variable staple heights (4.0 mm, 4.5 mm, 5.0 mm) and stepped cartridge face increase the compressibility of tissue and provide optimal staple formation in variable tissue thickness and transected the stomach horizontally.

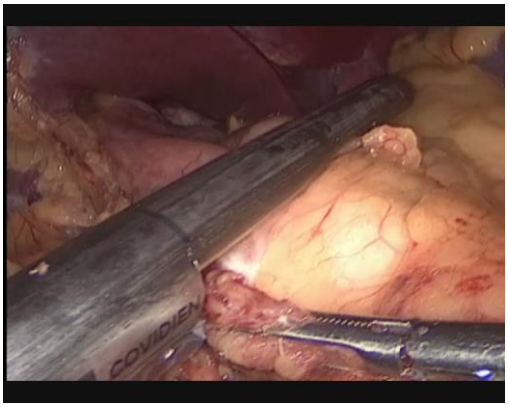

Figure (6): Transverse dissection of stomach

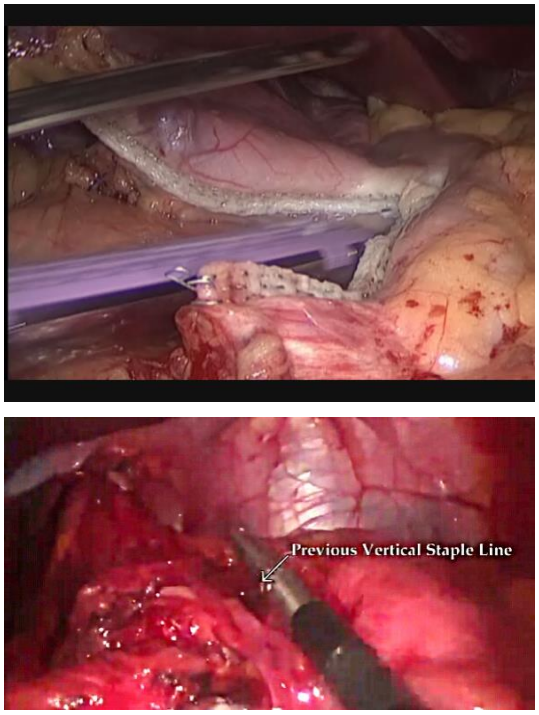

Figure (7): Identification of the previous staple line.

The gastric tube, starting in the antrum just above the previous transvers stable line. The diameter of the gastric tube was similar to that of the esophagus, and the volume of the gastric tube was about 60-80 ml. The endo-GIAs were applied just medial to the previous VBG staple-line for gastric tube creation if the VBG pouch was not dilated. If the gastric pouch was dilated, the staplers applied more medial to the previous VBG staple-line to reduce the volume of the dilated gastric pouch.

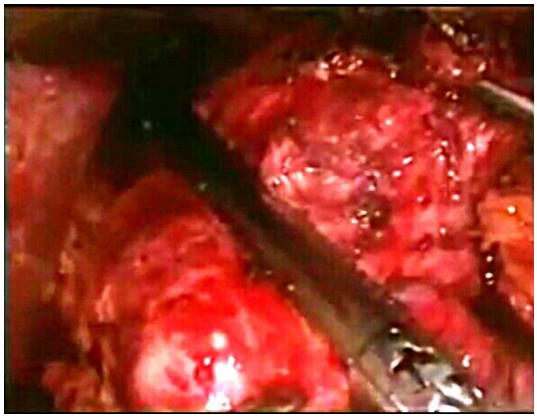

Figure (8): Transection of the stomach vertically.

Then, we continued the vertical stomach transection till the gastro-esophageal junction, using a French calibrating 38 Fr bougie strictly positioned against the lesser curve to avoid stenosis and to obtain a narrow gastric tube. We often used two or three cartidges to complete transection of the stomach, sometimes an additional 30 or 45 mm blue cartidge was needed. Thus creating long narrow stomach stump (The gastric pouch) and prepared for the creation of the gastro-jejunostomy.

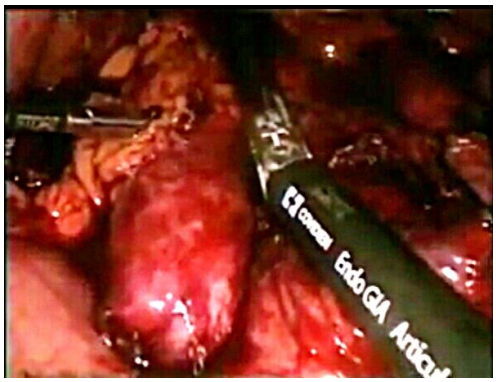

Figure (9): Vertical stomach transection guided by bougie.

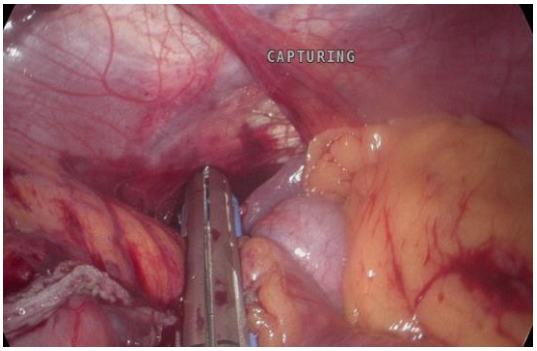

Figure (10): An additional 30 mm cartidge used.

Exposure of the duodeno-jejunal junction (figure 11- 12)

After elevation of the transverse colon and the transverse meso-colon, the ligament of Trietz was identified. We started to measure approximately 200 – 250 cm of jejunum distally from this point, then a stitch was taken at the anti-mesenteric border of the intestinal loop to facilitate bowel delivery to the gastric pouch.

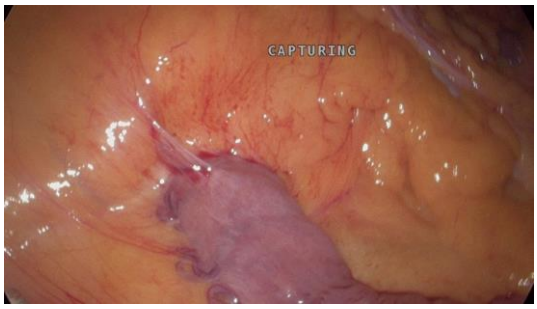

Figure (11): Identification of DJ junction.

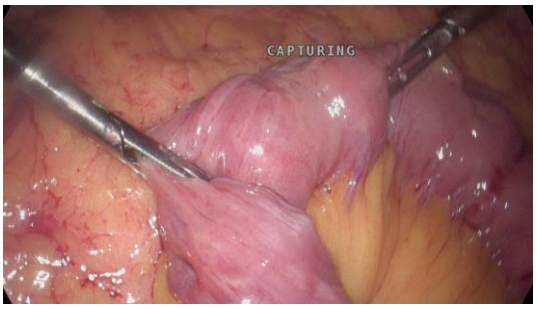

Figure (12): Measurement of jejunum.

1) The gastro-jejunal anastomosis (figure 13- 14):

Then, we approximated the bowel loop to the gastric pouch, when both are in position, the Harmonic scalpel® or ligasure were used to make an opening in the small bowel and another in the gastric pouch.

Anastomosis was done side to side by 45mm ETS 3.5 mm blue cartidge. The anastomosis was done with a wide stoma to facilitate drainage.

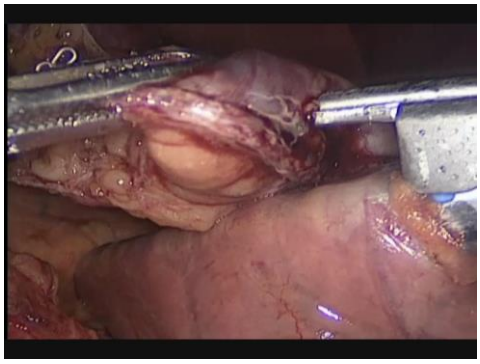

Figure (13): Gastro-jejunal anastomosis.

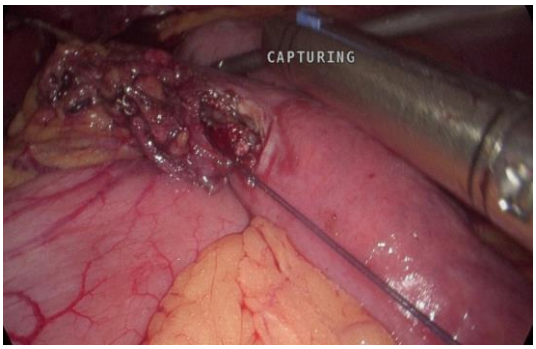

Figure (14): Anastomosis with wide stoma.

Then the stoma opening was closed with two layers continuous sutures using 2/0 absorbable vicryl® or using endostitch V-lock 2/0sutures

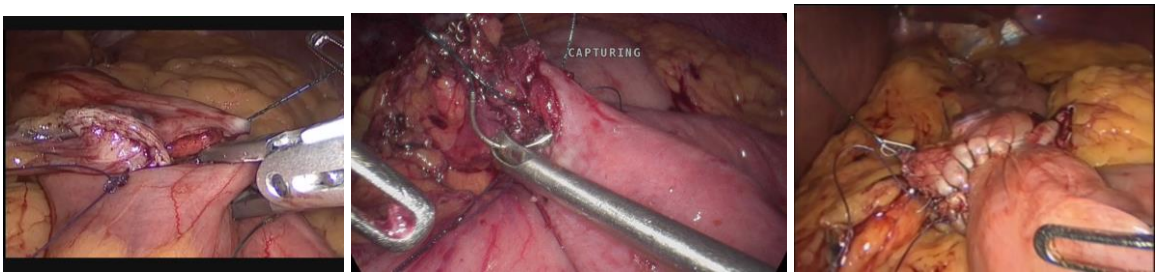

Figure (15): Closure of the staple opening.

Thereafter, leak test was performed through injection of about 50 cc of Methylene blue dye while both afferent and efferent loops were closed by intestinal clamps, anastomosis was carefully inspected all through and should be water tight

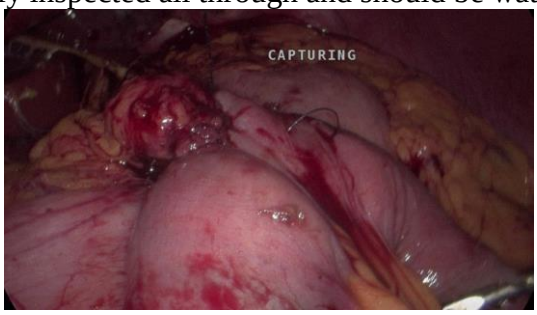

Figure (16): Methylene blue test.

28 fr tube drain was put in the lesser sac and the liver retractor was carefully removed before closure of all port openings by continuous subcuticular sutures.

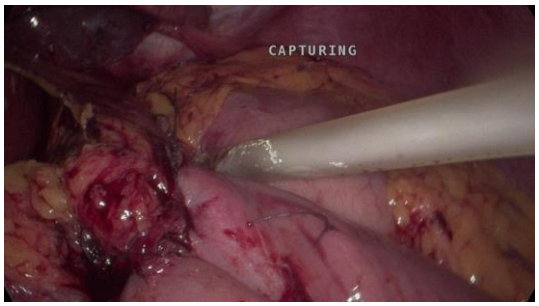

Figure (17): Insertion of the drain.

Figure (18): Closure of ports openings.

Post- operative management:

After recovery, ICU admission was limited to patients those with severe OSA and respiratory problems and patients with cardiac problems. Patients received nothing per mouth postoperatively till an upper gastro-intestinal water soluble contrast study was performed on the second postoperative day. Patients received subcutaneous LMWH (clexane®) 12 hours after surgery after ensuring that there is no bleeding; elastic stocking as a prophylactic measure against postoperative DVT and pulmonary embolism. Patients received intravenous third generation cephalosporin together with appropriate analgesia. The patients received proton pump inhibitors (omeprazole 40mg) to avoid stress ulcers. An upper gastrointestinal contrast study (gastro-graffin study) was routinely performed in the second postoperative day to examine the integrity of the staple line and the outlet stoma and determine the pouch size. Patients were usually discharged in the second or third post-operative day.

Follow up schedule.

Patient was instructed to follow up in outpatient clinic after the 1st week postoperative then after 1 month, 3 months, 6 monthes and after year

Statistical Analysis:

Data were collected, revised, coded and entered to the Statistical Package for Social Science (IBM SPSS) version 20. Qualitative data were presented as number and percentages while quantitative data with parametric distribution were presented as mean, standard deviations and ranges. The comparison between two paired groups regarding quantitative data with parametric distribution was done by using ***Paired t-test.*** The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:

P > 0.05: Non significant. P < 0.05: Significant. P < 0.01: Highly significant.

RESULTS;

Table (1): Demographic data of patients included in the study (n=30).

Parameter		Number	%
Gender	Male	3	10%
	Female	27	90%
Age (years)	Mean ± SD	35.83± 8.57	

Table (2): Preoperative obesity measurements of studied group (n=30).

		Total no.= 30
Age	Mean ± SD	35.83 ± 8.57
	Range	22 – 56
Sex	Female	27 (90.0%)
	Male	3 (10.0%)
BMI before VBG	Mean ± SD	46.82 ± 8.74
	Range	35 – 70
BMI before MGB	Mean ± SD	42.90 ± 7.21
	Range	34 – 62

Table (3): Pre operative causes of VBG revision.

Causes OF VBG revision	N	%
Eating difficulties	3	10.0
Severe GERD	9	30
unsatisfactory Weight loss	8	26.6
Weight regain	10	33.2
Total	30	100.0

Table (4): Obesity related co-morbidities.

Co morbid conditions	N	%
Degenerative Arthritis	5	16.6
Diabetes mellitus	6	20
Dyslipidemia	6	20
Hypertension	5	16.7
Ischaemic heart disease	0	0
Sleep apnea	3	10

Table (5): Intra operative complications.

Intra operative complication	N	%
Bowel injury	0	0
Liver tear	1	3.3
Staple line bleeding	3	10

Table (6): Early post operative complications.

Early comp.(< 1 month)	N	%
Bleeding	3	10
Leakage	1	3.3

Table (7): Late post operative complications.

Late complication(>1 month)	N	%
Late dumping	1	3.3
Reflux gastritis	3	10

Table (8): Follow up weight reduction.

Post operative weight loss		Total no.= 30
3 Months	Mean ± SD	38.03 ± 5.62
	Range	31 – 50
6 Months	Mean ± SD	33.98 ± 4.58
	Range	28 – 45
1 Year	Mean ± SD	29.22 ± 3.60
	Range	24 – 37

P-value in comparison with preoperative
P > 0.05: Non significant
P < 0.05: Significant
P < 0.01: Highly significant

Table (9): Values of preoperative and post-operative weight at 3, 6 months, 1 year.

	Mean ± SD	Range	Test value•	P-value	Sig.
BMI before MGB	42.90 ± 7.21	34 – 62	–	–	–
Post operative weight loss after 3 months	38.03 ± 5.62	31 – 50	13.330	0.000	HS
Post operative weight loss after 6 months	33.98 ± 4.58	28 – 45	13.851	0.000	HS
Post operative weight loss after 1 year	29.22 ± 3.60	24 – 37	19.290	0.000	HS

P-value > 0.05: Non significant; P-value < 0.05: Significant; P-value < 0.01: Highly significant
•: Paired t-test

Table (10): Follow up comorbidities.

Follow up co morbid conditions	N	%	1 years post	Resolution
Degenerative Arthritis	5	16.7	0	100%
Diabetes mellitus	6	20	2	86.7%
Dyslipidemia	6	20	0	100%
Hypertension	5	16.7	0	100%
Sleep apnea	3	10	0	100%

DISCUSSION:

Mini-Gastric Bypass (MGB) is a modification of the Mason's Loop Gastric Bypass with weight loss results similar to Roux-en-Y Gastric Bypass. This procedure has also been called One or Single Anastomosis Gastric Bypass.

Our study includes thirty (30) morbidly obese patients who fulfilled the criteria for bariatric surgery with BMI >40 or >35 with associated co-morbidities with failure of previous restrictive operation (VBG).

These patients were enrolled in a prospective study and had a retrospectively gathered outcome analysis at the department of surgery Ain-Shams University Hospitals.

Our study was conducted in El-Demerdash hospital, Ain- Shams University. Thirty patients were selected and operated upon from June 2017 till June 2019 and followed up to June 2020.

A comprehensive assessment program was carefully structured so that a disciplined routine is followed in each patient. All patients were pre-operatively and post-operatively evaluated.

Demographic and preoperative data: The mean age of our participants(30patients) was 35.83 ± 8.57 years (range, 22-556), the mean preoperative body mass index BMI was 42.9 ± 7.2 kg/m^2 (range, 43-62 kg/m^2)

Wang *et al. (2004)* From May 2001 to March 2003, 29 consecutive patients underwent LMGB for failed V B G. Average age was 39.7 years (range 22 to 56), and average BMI before re-operation was 41.7 kg/m^2 (range 35.0-70.8). 8 patients had previous open VBG, and 21 **had laparoscopic V B G.**

Noun et al. (2007) From June 2005 to September 2006, 17 patients with prior VBG (including 2 with prior redo VBG) There were 6 male and 11 female patients with a mean age of 41.3±10.3 years (range 20-64). The mean BMI before revision was 39.5±10.4 kg/m^2 (range 28-58 kg/m^2).

Salama and Sabry (2016) December 2013 to December 2015 Sixty patients (48 females and 12 males) presenting with failed

VBG, an average BMI of 39.7 kg/m^2 ranging between 26.5 kg/m^2 and 53 kg/m^2, and a mean age of 38.7 ranging between 24 and 51 years.

Causes of VBG revision: In our study causes of revision in (30) patients: weight regain (10) patients severe GERD (9) patients, un satisfactory weight loss (8) patients, eating difficulties (3) patients,

Noun et al. (2007) the reasons for revision surgery after open VBG were unsatisfactory weight loss or weight regain (6), intolerance to restriction (4), stomal stenosis or severe reflux esophagitis (4), and staple-line disruption (3).

Wang et al. (2004), the re-operation was for regain of weight in 16 patients, inadequate weight loss in 10 patients, and severe reflux esophagitis in 3 patients. Re-operation was performed after an average of 58.5 months (range 14 to 180).

Salama and Sabry (2016), 70% of patients were complaining from failing to achieve satisfactory weight loss or having weight regain after open VBG, while the remaining 30% were complaining from other VBG complications such as persistent vomiting, reflux esophagitis, or attacks of bleeding.

Operative data and hospital stay: In our study, the mean operative time was Mean operative time was 130 min, (range: from 90 min to 230 min). Only one case was converted to open due to liver tear hospital stay range from 2 to 5 days.

Wang et al. (2004), all the operations were completed laparoscopically without conversions. The average operative time was 171.4±15.3 minutes (range 130 to 290) and the length of hospital stay was 6.4±3.2 days (range 2 to 28).

Noun et al. (2007), operative time range from 184 to 155 min. and the mean length of hospital stay was 5.7±2.3(range 2 – 29)

Salama and Sabry (2016), the mean duration of intervention was 145 min (ranging from 125 to 235 min) and the mean length of hospital stay was 4.7 days (ranging from 4 to 18 days).

In the current study, there was statistically significant difference between the preoperative and postoperative weight, BMI and at 3, 6, 12 months following MGB operation and remarkable improvement in obesity related comorbidities had occurred which is more evident with hypertension, diabetes and Dyslipidemia.

Main outcome measures (Weight and BMI); in our study The mean initial BMI for the patients was The preoperative BMI with mean ± SD: 42.9 ± 7.21 kg/m^2, was higher than post-operative BMI at 3 months with mean ± SD value of 38.03± 5.62 kg/m^2), than post-operative BMI at 6 months with mean ± SD value of 33.98 ± 4.58 kg/m^2, than post-operative BMI at 12 months with mean ± SD value of 29.22 ± 3.60 kg/m^2,

These results were comparable to *Noun et al. (2012) and Wang et al. (2005)* reported mean BMI of 28.3 and 28.4 one year postoperatively with a mean initial BMI of 42.5 and 44.2 kg/m^2 respectively.

Salama and Sabry (2016), The mean BMI decreased to 30.1 kg/m^2 (ranging from 24.8 kg/m^2 to 41.5 kg/m^2) after 1 year of the operation.

Resolution of the comorbidities; in our study we had 100% resolution of hypertension and remission of diabetes in 86.7% of patients one year after surgery, the remaining case showed improvement in diabetic state observed in reduction of the daily dose of oral hypoglycemic drugs.

These results were comparable to ***Noun et al. (2012)*** with resolution rate of 85% of both diabetes and hypertension; ***Wang et al. (2005)*** who reported 100% resolution of diabetes and 94% resolution of hypertension;

Mortality: in our study, we reported no post-operative mortality. In most studies mortalities were low and most were not surgery related.

Complication (bleeding) in our study were intra-abdominal bleeding in 3 patients, it was related to staple-line bleeding and managed by suturing the staple line by secondary layer continous vicryl and 1 cases liver laceration had occurred during dissection stomach and mesh from liver and managed intra- operatively by surgical absorbable hemostat. We also had 3 patients (10%) with bleeding which was discovered from the suction drain (>500 cc blood in the first 24 hours) but it stopped spontaneously on conservative treatment with blood transfusion.

Carbajo et al. (2010) recorded 2 bleeding events (0.9%) within 24 hours after surgery and mini-laparotomy was used for hemostasis;

Muscelli et al. (2005) reported 25 (2.5%) abdominal bleeding cases;

Noun et al. (2012) reported 15 (1.6%) bleeding cases of which 12 might be stable-related bleeding. Also ***Wang et al. (2004),*** three patients (10.3%) experienced early complications. One postoperative upper gastrointestinal bleed from the staple-line presented as blood draining from the nasogastric tube with hypovolemic shock. Blood transfusion was required, and the bleeding stopped after conservative treatment.

Leakage: In our study there was one case (3.3%) of minor leakage which was treated conservatively with intra-abdominal pig tail left for 16 days till leakage stopped. These results were comparative to ***Wang et al. (2004)*** who reported 9 cases of leakage (2.1%); ***Carbajo et al. (2010)*** who reported 4 cases (1.9%) of leakage. Also ***Rutledge and Walsh (2005)*** reported 1.8% of leakage; ***Muscelli et al. (2005)*** had 10 cases (1%) of leakage.

Salama and Sabry (2016), there was only one case out of the 39 cases that had leakage which was a traumatic injury due to hard grasping of the intestinal loop and not due to leakage from the gastrojejunostomy anastomosis.

Conclusion:

Mini-gastric bypass offers major benefits with quite satisfactory results over most alternative procedures. Our data, which includes follow up of two years, indicates that mini gastric bypass is: An effective procedure for the treatment of failed restrictive procedure (VBG). Technically feasible. Safe operation with a low rate of major postoperative complications. Has a significant reduction in patient's hospital stay. Helps in the achievement of a significant weight loss and improvement of obesity related metabolic co morbidities. Efficient in loosing excess weight and in maintaining the weight loss. so it is considered a promising revisional bariatric procedure operation for patients with failed prior open or laparoscopic VBG

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نتائج عمليه تحويل مسار المعده المصغر بعد فشل عمليه تدبيس المعده فى علاج المرضي الذين يعانون من السمنة المفرطة

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خلفية: لطالما تم تقديم عمليات جراحة السمنة للتحكم في الوزن خصوصا إذا فشل العلاج التحفظي فى نزول الوزن وقد حظيت عمليات السمنه بقبول واسع النطاق في العقود الماضية. مقارنة بالاستراتيجيات غير الجراحية، أثبتت جراحات السمنه فاعلية أكبر للأشخاص الذين يعانون من السمنة المتوسطة والشديدة لفقدان الوزن. إلى جانب ذلك، أثبتت جراحات السممنه أنها علي المدى الطويل تؤدى الى حدوث تحسن للأمراض المصاحبة المرتبطة بالسمنة

الهدف من البحث: نتائج عمليه تحويل مسار المعده المصغر بعد فشل عمليه تدبيس المعده فى علاج المرضي الذين يعانون من السمنة المفرطة

المرضي وطرق العلاج: تشتمل عمليات السمنه على عمليات تعتمد على تقليل المتصاص وعمليات اخرى تعتمد علي تصغير حجم المعده فقط,ويوجد نوع اخر من العمليات يعتمد علي الجمع بين النوعين السابقين مثل عمليه تحويل المسار بنوعيها الكلاسيكى والمصغر

النتائج: في الختام، تقدم عمليه تحويل مسار المعده المصغر فوائد كبيرة مع نتائج مرضية تمامًا مقارنة بمعظم الإجراءات البديلة. تشير بياناتنا، التي تتضمن متابعة لمدة عامين، إلى أن عمليه تحويل المسار المصغر هي عمليه فعاله لعلاج فشل عمليات تدبيس المعده السابقه حيث انها سهله تقنيا وامنه مع معل مضاعفات اقل بعد العمليه كما انها حققت انخفاض فى معدل مكوث المرضى بالمستشفى بعد اجراء العمليه بالاضافه الي تحقيق انخفاض ملحوظ فى الوزن وحدوث تحسن للامراض المصاحبه للسمنه المفرطه

الخلاصة: ولذلك تعتبر من العمليات الواعده فى مجال جراحات السمنه لتصحيح فشل عمليه تدبيس المعده السابقه سواء التى تمت جراحيا او باستخدام المنظار الجراحي.