

## Outcomes and Complications of Mini-Gastric Bypass Surgery for Treatment of Obesity

Safauldeen Salim Al Baaj<sup>1\*</sup>, Mohammed Abdulkareem Abboodi Altameemi<sup>2</sup>,  
Hazim Kareem Nassr Dulaimi<sup>3</sup>

### Author's Information

- 1.MBChB, FICMS, Professor and Consultant of General Surgery, Faculty of Medicine, University of Kufa - Iraq
- 2.MBChB, CABS, CABS, Al Sader Teaching Hospital, Najaf-Iraq
- 3.MBChB, FICMS, Al Sader Teaching Hospital, Najaf-Iraq

### Corresponding author:

Mohammed Abdulkareem Abboodi Altameemi  
[drmohammedaltameemi@gmail.com](mailto:drmohammedaltameemi@gmail.com)

### Funding information

Self-funded

### Conflict of interest

None declared by author

Received: March, 2024

Published: May, 2024

### ABSTRACT

#### Background:

Mini-gastric bypass is a successful weight loss surgery together with a great impact on metabolic syndrome. is a new emerging bariatric surgery procedure with current debates on its efficacy and safety.

#### Objective:

The aim of this study is to evaluate the effect of minigastric bypass on weight loss, outcomes, and complications.

#### Patients and methods:

The study has been carried out in Al Sadder Teaching Hospital and other private hospitals in Al-Najaf Al Ashraf from 2015 to 2018. A total of 50 patients were included in this study, of whom 35 were female and 15 were male. All patients underwent minigastric bypass surgery and short term followed up post operatively . Its impact on BMI change, excess weight loss (%EWL), and associated problems were reported post operatively. The study was done as a case series ( single group interventional study)

#### Results:

The mean EWL was 77% over 18 months. 6 patients were diabetic, who got remission, the hospital stay was 1-2 days. one patient had anastomotic ulcers, one patients had biliary gastritis and one patients had gastric outlet obstruction were all managed with Re-operation, 15 patient had remarkable hair loss, 2 patients developed anemia were managed by medications, one patients developed gallstones and laparoscopic cholecystectomy done for him, one patients had psychological problem that solved with reversal surgery. The quality of life, sleep apnea and sexual activity improved after MGB .

#### Conclusions:

Minigastric bypass is provisionally effective as other standard bariatric surgery procedures, with good impact on associated metabolic diseases.

**Keywords:** Obesity, Treatment, surgery, Mini-Gastric Bypass Surgery

This article is open access published under CC BY-NC Creative Commons Attribution Non-Commercial License: This License permits users to use, reproduce, disseminate or display the article provided that the author is attributed as the original creator and that the reuse is restricted to non-commercial purposes , ( research or educational use).



## 1. INTRODUCTION

Obesity is a medical disease ,has big health impact that threatened life and has become one of the most important health issues in both developing and developed countries, numerous medical and surgical strategies aiming at weight reduction have been pursued, currently, surgery is the only method for the treatment of morbid obesity that has been found to be effective and long-lasting(1,2,3).Vertical banded gastroplasty (VBG) and Roux-en-Y gastric bypass (RYGBP) were the two popular operations approved by the NIH(4) , and adjustable gastric banding(AGB) operations are being performed(5) .The gastric restrictive surgeries, including VBG, AGB, and RYGBP have become more popular than the malabsorptive operations over the past decade, and RYGBP has been the gold standard for bariatric operations in the USA.(6)The number of bariatric operations worldwide has increased greatly since the introduction of laparoscopic techniques, which have been shown to be safe and effective alternatives to open bariatric surgery(7-10) ,Although it has become the most popular treatment method for morbid obesity, laparoscopic RYGBP remains a challenging procedure and ranks as one of the most difficult laparoscopic surgeries(6,11) ,The laparoscopic mini-gastric bypass (LMGB),first reported by Rutledge,(12) is a procedure which uses a divided vertical tube gastroplasty in conjunction with a loop gastrojejunal bypass, which causes weight loss by both restriction and malabsorption. According to Rutledge's report, it is a safe and effective procedure with better reversibility. there is some controversy concerning complications. (13) Further evidence is required before firm conclusions can be made.

## 2. METHODOLOGY

This was a single group interventional study conducted at Al Sadder medical city, and other private hospitals in Al Najaf al Ashraf, Iraq , the patients followed prospectively at different times intervals (6-12-18 months).

Patients enrolled in this study from 2015 to 2018, fifty patients underwent surgery for obesity at the Al Sadder medical city and others private hospital in Al Najaf Al Ashraf. They were 15 male and 35 female patients the age range from 18-60 years. The BMI range 32 -65kg/m<sup>2</sup>.the indications for surgery are obesity (BMI > 32kg/m<sup>2</sup>) with or without comorbidities, the patient followed short terms postoperatively and the they were prepared for the operation by full

history taking including medical history and life style, investigated with full blood counts, ESR, liver function tests, renal function test , and others important hormonal analysis, lipid profile , HbA1c and blood sugar . the patients were evaluated by physician though ECG and Echocardiogram, all had abdominal ultrasound examination and few of them who had upper GI symptoms subjected to upper endoscopic examination according to suspicion of upper GI problems, and few of them needs psychological assessment. patients with super morbid obesity instructed to had two weeks of dietary regime (low fat and low carbohydrate diets) to reduce liver mass for facilitating the surgery .

### **Procedure and Surgical Techniques**

We will discuss our technique. the patient receive general anesthesia in reverse Trendelenburg position , legs are wrapped with bandage and separated (mechanical prevention of DVT), lesser omentum opened 60mm, cartridge articulating handle cutting the stomach transversely , then 60mm cartridge cutting the stomach up to the angle of His over 34F bougie , thus long pouch in the lesser curvature created accommodating around 120-150ml ,ligaments of treitz identify ,150-200cm long loop of small bowel from DJ measure then anastomosed with the pouch with 60 mm cartridge, anterior to transverse colon.

in case of heavy omentum , the omentum is divided, leak test done by irrigating the stapler line with saline fluid and insufflate the stomach with air then monitor air bubble , drain put at anastomosis site .

Nasogastric tubes were removed on the day 0 postoperative day, and patients were encouraged to ambulate early.methylene blue leak test were performed on the first postoperative day,and oral intake was commenced if no signs of leakage. Patients were usually discharged on the first postoperative day. A fluid diet was recommended in the first two weeks. The obesity-related co- morbidities were recorded, including, hyperglycemia, degenerative joint disease, gallbladder stones,sleep apnea. The patients were scheduled to undergo evaluation of nutritional status, laboratory studies and clinical evaluation at the first month and then every 3 months for the first year. Multivitamins were routinely prescribed after discharge. Panendoscopy (upper ± lower GI endoscopy), and 24-hour pH-meter studies were not routinely

performed at follow-up unless the patient complained of GI symptoms suspicious of GI problems.

#### **Statistical analysis:**

Data were managed and analyzed using the statistical package for social sciences version 25 (SPSS25). Appropriate statistical tests were applied accordingly at a level of significance of  $\leq 0.05$

### **3. RESULTS**

A total of 50 patients were enrolled in this study they were 35 females and 15 males, their age ranged between 18 – 60 years with a mean of  $31.1 \pm 8.4$  years. Mean baseline BMI was  $48.9 \pm 3.8$  kg/m<sup>2</sup>, (Table 1 and Figure 1). Excess weight at baseline was 76.3% of the ideal body weight ranged between 62.3% and 140.1%. The mean excess weight loss percentage (%EWL) was 44%, 62%, and 77% at 6, 12, and 18months respectively, (P. value  $<0.001$ ), (Table 2). The mean BMI significantly reduced at each follow up time. It decreased from 48.9 to 36.1, 30.7 and 26.2 kg/m<sup>2</sup> at 6,12, and 18months respectively, (P. value  $<0.001$ ). Results of bivariate correlation analysis for the changes in EWL at different points of follow up with age and gender of the patients revealed no significant effect of these two variables on the changes in the EWL , in all correlations, P. value  $> 0.05$ , (Table 4). The operative time ranged between (60-150 minutes) and postoperative hospital stay was (1-2) days. Regarding complications and sequels of MGB of our patients, they are summarized in (Table 5) where each of small bowel injury, anastomosis ulcer, bile reflux and gastric outlet obstruction reported in one patient. The sequel encountered in 19 patient of them 15 patients developed hair loss, 2 patients had mild anemia, one patient with psychological upset and one patient developed gallstones. Both complications and sequels were managed accordingly. Fortunately, no mortalities occurred among our patients and no further serious complications had been reported like pulmonary complications, deep vein thromboses. From other point of view, in 6 patients hyperglycemia resolved within the first day. Sleep apnea, joint pain and quality of life improved after MGB.

Table 1. Baseline characteristics of the studied group

Variable	Mean	SD*	Range
Age (year)	31.1	8.4	18 - 60
Weight (kg)	127.3	8.3	115 - 200
Height (cm)	161.6	6.3	150 - 190
BMI (kg/m <sup>2</sup> )	48.9	3.8	32.6 - 65.3

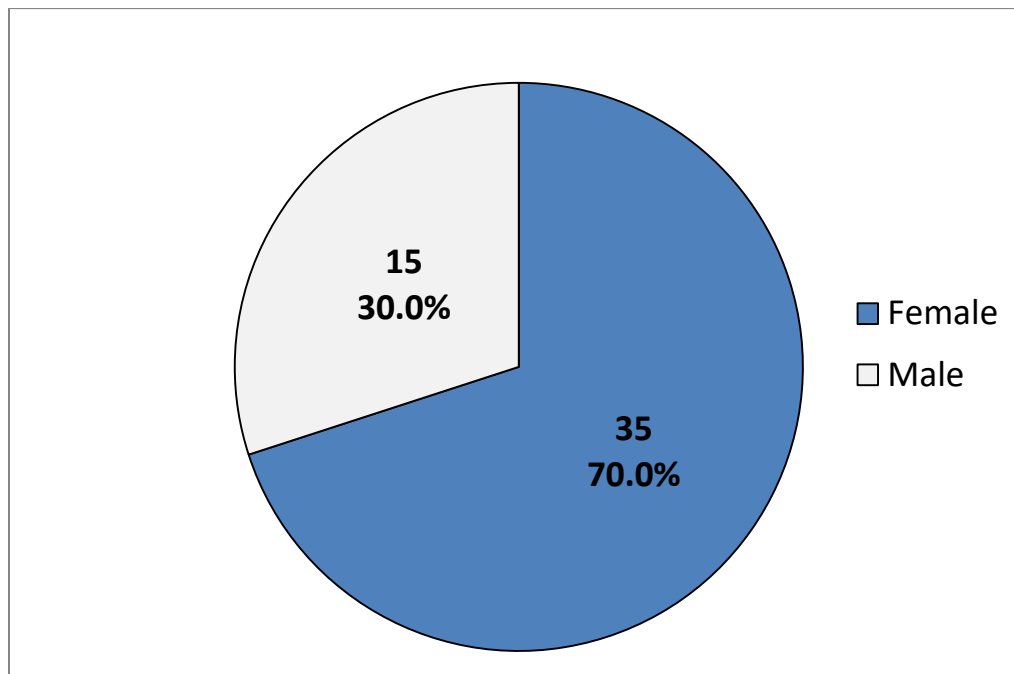


Figure 2. Gender distribution of the studied group (N=50)

Table 2. Mean Excess weight loss and percentages at different follow up time of the studied group (N=50)

Measurement point	EWL (kg)	Percentage of EWL			
		Mean	SD	Range	
				Minimum	Maximum
Excess weight at baseline	-	76.3%	7.5%	62.3%	140.1%
EWL at 6 months (kg)	33.3	44.0%	5.0%	30.0%	64.0%
EWL at 12 months (kg)	47.2	62.0%	6.0%	50.0%	77.0%
EWL at 18 months (kg)	58.9	77.0%	7.0%	58.0%	91.0%
P. value		< 0.001			

EWL: Excess weight loss (from the baseline excess weight)

Table 3. Changes in BMI of the patients at different points of follow up (N=50)

Measurement point	Mean	SD	Range	
			Minimum	Maximum
BMI at baseline	48.9	3.8	32.6	65.2
BMI at 6 month (kg/m <sup>2</sup> )	36.1	2.7	29.4	43.6
BMI at 12 month (kg/m <sup>2</sup> )	30.7	2.4	25.7	35.6
BMI at 18 month (kg/m <sup>2</sup> )	26.2	2.3	22.0	32.0
P. value	< 0.001			

Table 4. Results of bivariate correlation analysis of changes in EWL at different points of follow up with age and gender of the patients

Parameter	Statistic	Age	Gender
EWL at 6 months	<i>R</i>	0.069	0.102
	<i>P. value</i>	0.634	0.480
EWL at 12 months	<i>R</i>	0.12	0.239
	<i>P. value</i>	0.405	0.094
EWL at 18 months	<i>R</i>	0.104	0.189
	<i>P. value</i>	0.472	0.221
Overall	<i>R</i>	0.232	0.173
	<i>P. value</i>	0.382	0.526

Table 5. Complications and sequels of mini-gastric bypass of the studied group (N=50)

Variable	No.	%	Management
<b>Complications</b>			
Small bowel injury	1	2.0	Re-Operation
Anastomosis ulcer	1	2.0	Re-Operation
Bile reflux	1	2.0	Laparoscopic enteroenterostomy
Gastric outlet obstruction	1	2.0	Laparoscopic reversal
<b>Sequels</b>			
Gallstones	1	2.0	Laparoscopic cholecystectomy
Hair loss	15	30.0	Multivitamins supplement, Minoxidil shampoo
Anemia	2	4.0	Iron and vitamin B12 supplement
Psychological upset	1	2.0	Laparoscopic reversal

#### 4. DISCUSSION

Bariatric operations have been evolving over the past 40 years, and the ideal surgery is still the subject of debate. (14) VGB provides EWL of 40-50% at about 1 year with the maximum efficacy at 12-18 months,(11)but weight regain after maximal weight loss and persistent vomiting is drawbacks of the VBG. several studies has shown that the quality of life fail to improve after laparoscopic VBG (15) .Studies of long-term weight loss have demonstrated the priority of RYGBP over VBG. (11,16) Although limited in short-term follow-up, our study confirmed that the MGB is a simple and effective operation with efficacy similar to RYGBP in terms of reducing obesity-related co-morbidities and metabolic complications and the main weight loss similar to other studies. However, MGB has the advantage of less anastomosis, preserved continuity of the intestine, easy ante colic anastomosis, and a larger gastric pouch for possible operative reversal in the future, and the patient can tolerate eating more than RYCBP and less complications than RYCBP. EWL in MGB at 1 year is 62%, which is similar to that of the RYGBP and similar to other MGB studies.

In the Rutledge series of 1274 patients, mean of BMI 27,9% and the mean of EWL 75% at 18 months. there was only one hospital death, and the complication was 7.5%.(12) . The data in

our series has been collected up to 18 months, which is not long enough to determine long-term effects on weight loss and complications, but the current results suggest that the operation is generally safe and effective.

In Abdulazhara series 266 primary single anastomosis gastric bypasses were performed and an additional 7 second stage single anastomosis gastric bypasses after an initial first stage sleeve gastrectomy. Patients were 186 women and 87 men with a median BMI of 48.1 (range: 33-78) kg/m<sup>2</sup> and 36% of those patients had a BMI above 50 kg/m<sup>2</sup>. Moreover, in that study 21% of cases were diabetic. Sleep apnoea reported in 6%, while 19% were hypertensive and 31% had arthritis. Excess body weight loss ranged between 41-125% with a mean of 76%.

The preoperative diagnosis of diabetes was 21%, postoperatively, complete remission was 83%. Hypertension resolution reported in 61%. All sleep apnoea patients had been improved symptomatically with none requiring CPAP machine after one year. Two patients developed diarrhoea cured by shortening the afferent limb and three stomal ulcers were reported, one of which needed revision surgery. In our study, the mean EWL was 77% which is similar to Rutledge and Abdulzahra studies(17), 6 patients was diabetes and postoperatively they got complete remission . The quality of life, sleep apnea, joint pain, sexual activity was significantly improved after MGB. Regarding complications and sequels, one patient had small bowel injury managed by Re-operation, one patients had anastomosis ulcer , one was subsequently diagnosed with bile reflux gastropathy and enteroenterostomy done for him. one patients noted to have gastric outlet obstruction which managed by Re-operation (gasterogastrostomy). one patient develops gall stones disease and managed by laparoscopic cholecystectomy, Anemia after MGB is likely due to the duodenal bypass with malabsorption of iron. Anemia could be controlled by long-term iron supplementation. Marginal ulcer with chronic bleeding may contribute to anemia. Hair loss may be due to that the patients poor compliance with multivitamin supplement .Multivitamin and iron supplements are now routinely prescribed after the first appointment, and the incidence of anemia and hair loss has fallen. The results of long-term follow-up and randomized trial will be needed to confirm its efficacy and safety.



## 5. CONCLUSIONS

Minigastric bypass is promising surgery. It is provisionally effective and safe like other standard bariatric procedures. Based on our experience to date, the mini-gastric bypass appears to be a safe and effective operation for the treatment of morbid obesity. Moreover, it has good impact on associated metabolic diseases such as diabetic mellitus. and quality of life. Hence mini-gastric bypass is safe and effective bariatric surgery for short term results and need further long term monitoring and researches to understand its long term efficacy and safety , also we need to try another procedure such as SASI(single anastomosis sleeve ileal bypass ) and SADI (Single-Anastomosis Duodeno-Ileal bypass with Sleeve gastrectomy ) and do researches about its outcomes.

### **Ethical Approval:**

All ethical issues were approved by the author. Data collection and patients enrollment were in accordance with Declaration of Helsinki of World Medical Association , 2013 for the ethical principles of researches involving human. Signed informed consent was obtained from each participant and data were kept confidentially.

## 6. BIBLIOGRAPHY

1. Must A, Spadano J, Coakley EH et al. The disease burden associated with overweight and obesity. *JAMA* 1999; 282: 1523-9.
2. Deitel M. Overweight and obesity worldwide now estimated to involve 1.7 billion people (Editorial). *Obes Surg* 2003; 13: 329-30.
3. Foreyt JP, Goodrick GK, Gotto AM. Limitations of behavioral treatment of obesity: review and analysis. *Behav Med*, 1981; 4: 159-74.
4. Gastrointestinal surgery for severe obesity. National Institutes of Health Consensus Development Conference Draft Statement. *Obes Surg* 1991; 1: 257-66.
5. Chevallier JM, Zinzindohoue F, Douard R et al. Complications after laparoscopic adjustable gastric banding for morbid obesity: Experience with 1,000 patients over 7 years. *Obes Surg* 2004; 14: 407-14.
6. Schauer P, Ikramuddin S. Outcomes after laparoscopic Roux-en-Y gastric bypass for morbid obesity. *Ann Surg* 2000; 232: 515-29.
7. Wittgrove AC, Clark GW, Tremblay LJ. Laparoscopic gastric bypass, Roux-en-Y: preliminary report of five cases. *Obes Surg* 1994; 4: 353-7.

8. Hess DW, Hess DS. Laparoscopic vertical banded gastroplasty with complete transection of the stapleline. *Obes Surg* 1994; 4: 44-6.
9. Belachew M, Legrand M, Vincent V et al. Laparoscopic placement of adjustable silicone gastric band in the treatment of morbid obesity: how to do it. *Obes Surg* 1995; 5: 66-70.
10. Lee WJ, Lai IR, Huang MT et al. Laparoscopic versus open vertical banded gastroplasty for the treatment of morbid obesity. *Surg Laparosc Endosc* 2001; 11: 9-13.
11. Lee WJ, Huang MT, Yu PJ et al. Laparoscopic vertical banded gastroplasty and laparoscopic gastric bypass: a comparison. *Obes Surg* 2004; 14: 626-34.
12. Rutledge R. The mini-gastric bypass: experience with the first 1,274 cases. *Obes Surg* 2001; 11: 276-80.
13. Fisher BL, Buchwald H, Clark W et al. Mini-bypass controversy. *Obes Surg* 2001; 11: 773-7.
14. Buchwald H, Buchwald JN. Evolution of operative procedures for the management of morbid obesity 1950-2000. *Obes Surg* 2002; 12: 705-17.
15. Lee WJ, Yu PJ, Wang W et al. Gastrointestinal quality of life following laparoscopic vertical banded gastroplasty. *Obes Surg* 2002; 12: 819-24.
16. Howard L, Malone M, Michalek A et al. Gastric bypass and vertical banded gastroplasty: a prospective randomized comparison and 5-year follow-up. *Obes Surg* 1995; 5: 55-60.
17. A Hussain, S El-Hasani  
Hussain A, EL-Hasani S. Our initial experience with Single Anastomosis Gastric Bypasses. A study of 273 patients. *British Journal of Surgery* 2017; 104 (S2):6. Available at: <https://bjssjournals.onlinelibrary.wiley.com/doi/10.1002/bjs.10494>

**Citation:**

Al Baaj S.S., Altameemi M.A., Dulaimi H. K. Outcomes and Complications of Mini-Gastric Bypass Surgery for Treatment of Obesity. *AJMS* 2024; 10 (2): 154-63