Al-Azhar Med. J . (Surgery). *Vol. 51(3), July, 2022, 1427 –1442*
DOI: 10.21608/amj.2022.240671
https://amj.journals.ekb.eg/article_240671.html

SINGLE ANASTOMOSIS DUODENO-ILEAL BYPASS WITH SLEEVE GASTRECTOMY VERSUS MINI-GASTRIC-BYPASS FOR TREATMENT OF TYPE-2-DIABETES MELLITUS IN OBESE PATIENTS

By

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ABSTRACT

Background: Bariatric surgery has been shown in multiple studies to produce substantial durable weight loss and improve or cure many of the symptoms of metabolic syndrome including type II diabetes, hypertension, sleep apnea and hyperlipidemia.

Objective: To review the difference between laparoscopic single anastomosis duodeno-ileal bypass with sleeve gastrectomy versus mini-gastric-bypass regarding the efficacy for control of type 2 diabetes mellitus in obese patients.

Patients and Methods: This was a prospective study which was done in between Dec 2018 - Dec 2020 at Al-Azhar University Hospitals, Cairo, Egypt. The study included 50 obese patients with type 2 Diabetes. The patients were divided to two groups. Group one had laparoscopic single anastomosis duodeno-ileal bypass with sleeve gastrectomy and group two had mini-gastric-bypass and follow up was carried for one year. Operations were operated by the same surgical team at Al-Azhar University Hospitals.

Results: The mean BMI loss after one year from SADIS surgery was 21.6 kg/m2 ± 2.0034 kg/m2 versus 20.6 kg/m2±1.0239 kg/m2 in MGB procedure. Complete resolution of diabetes occurred in 88 % in SADIS versus 84 % in MGB operation. Regarding hypertension, resolution of hypertension was 76.7% in SADIS versus 66.5 % in MGB. Regarding Hyperlipidemia, resolution in 92%, improvement in 8% in SADIS operation versus 88% resolution, 12% improvement, 8 % minimal effect in MGB operation.

Conclusion: The effect of laparoscopic single anastomosis duodeno-ileal bypass with sleeve gastrectomy and mini-gastric-bypass on the glucose metabolism and weight reduction has a profound impact in treating T2DM. It was a safe solution for carefully selected patients with metabolic syndrome; which decrease the risk of cardiovascular and metabolic diseases.

Keywords: Single Anastomosis Duodeno-Ileal bypass, Sleeve Gastrectomy, Mini-Gastric-Bypass, Type-2-Diabetes Mellitus, Obese Patients.

INTRODUCTION

Global obesity, defined as a body mass index (BMI) greater than 30 kg/m2, is on the rise. Over the last thirty years mean BMI in individuals aging 20 years or older has increased at an escalating rate of 0.4 kg/m2 per decade. This disease is a complex multisystem condition, associated with increased comorbidities such as type two diabetes (T2DM), dyslipidemia, hypertension, obstructive

sleep apnea, heart disease and stroke *(Finucane et al., 2011).*

Diabetes mellitus (DM) is a metabolic disease characterized by the presence of hyperglycemia secondary to insulin secretion deficit or absence and/or to a receptor or post-receptor defect in insulin action, with impaired insulin secretion and/or biological action. Specifically, type 2 diabetes mellitus (T2DM) is due to resistance to insulin action and to a relative deficiency in insulin secretion *(Mabel et al., 2018).*

Bariatric surgery is defined as gastrointestinal surgery to help severely obese patients to lose weight. It offers the only realistic chance of long-term weight reduction, and resolution or improvement of co-morbidity for the majority of these patients like Diabetes mellitus. In the early 1980s, surgeons realized that many patients with type 2 diabetes who had undergone gastric bypass for the treatment of morbid obesity experienced a complete diabetes remission *(Pournaras et al., 2010).*

Bilio-pancreatic diversion was originally described by Scopinaro in 1979 as an alternative to jejunoileal bypass for severely obese patients *(Biertho et al., 2016).*

Single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) is a novel bariatric operation based on the principles of bilio-pancreatic diversion. The reason for developing a new technique or for modifying a pre-existing one was to simplify the procedure, to decrease the potential complication rate, and to maintain or even to improve, if possible, the out-comes of the original operation *(Pernaute et al., 2015).*

The advantage of SADIS is one anastomosis, less enteric hernias; less protein malnutrition with powerful diabetic remission especially type 2 diabetes mellitus *(Dorman et al., 2012).*

The Mini gastric bypass (MGB) procedure was first developed by Dr Robert Rutledge from the USA in 1997, as a modification of the standard Billroth II procedure. Mini gastric bypass involves making of a long narrow tube of the stomach along its right border, the lesser curvature. A loop of the small gut is brought up and hooked to this tube at about 180 cm from the start of the intestine (ligament of Treitz) *(Akkary, 2012).*

Some authors termed bariatric surgery as metabolic surgeries induce long-term remission of type 2 diabetes mellitus (T2DM) and dramatically improve other metabolic abnormalities, such as hyperlipidemia and hypertension, independent of the patient's weight. Some previous studies demonstrated that these metabolic effects are not only effective because of weight loss and diminished caloric intake, but also due to endocrine changes that result from surgical manipulation of the gastrointestinal tract. Here, we evaluate the clinical evidence that demonstrate the effects of metabolic surgery on T2DM and discuss the implications for future research *(Yang et al., 2015).*

Despite continuing advances in diabetes pharmacotherapy, approximately half of adults with type 2 diabetes mellitus (T2DM) attain therapeutic goals designed to reduce long-term risks of complications, especially for glycemic control, and lifestyle interventions are

disappointing in the long term. In facing these challenges, it is imperative that interventions that may interdict the disease process and complement existing therapies be expeditiously advanced into clinical practice while also balancing the costs attributed to each intervention *(Kim et al., 2015).*

The present work aimed to compare single anastomosis duodeno-ileal bypass with sleeve gastrectomy versus mini-gastric-bypass in treatment of type-2 diabetes mellitus in obese patients.

PATIENTS AND METHODS

This was a prospective study which was done from Dec 2018 to Dec 2020 at Al-Azhar University Hospitals, Cairo, Egypt. The study included 50 patients with obesity type 2 Diabetes.

Group one had laparoscopic single anastomosis duodeno-ileal bypass with sleeve gastrectomy and group two had mini-gastric-bypass and follow up was carried for one year.

Inclusion Criteria of the patients:

- They were willing to give consent and comply with the evaluation and treatment schedule.
- Their age between 18 and 60 years, both males and females.
- Their body mass index (BMI) > 30 kg/m2.
- Supportive family/social environment.
- No alcohol or Substance Abuse.
- All patients have metabolic syndrome with obesity (BMI > 30), diabetes mellitus (HbA1c>6.5) with one or both.
- Hypertension (Systolic Blood Pressure >130 and Diastolic Blood Pressure>85).
- Hyperlipidemia (TGs >150 mg/dl and T. Cholesterol >200 mg/dl, HDL< 40 mg/dl).

Exclusion Criteria of the patients:

- Endocrine abnormalities, e.g. hypothyroidism, Cushing syndrome.
- Previous bariatric operations.
- Major upper abdominal surgery or significant abdominal ventral hernia.
- Patient with contraindications for insufflation as those with sever cardiovascular or sever restrictive respiratory diseases.
- Patient with major psychiatric illness.

Preoperative assessment:

1. Age and gender.
2. Full clinical assessment:
3. Full medical history with special notes on history of attempts to lose weight for more than two years, detailed dietary history, associated co-morbidities, eating habits, psychological status, history of previous laparotomy especially gastrointestinal surgery, full clinical examination including BMI, full laboratory investigations: complete blood picture, liver function tests (SGOT / SGPT / Serum Albumin), kidney function tests (Urea / Creatinine), lipid profile (LDL / HDL / Triglyceride / Cholesterol), thyroid profile (TSH / Free T3, T4), hemoglobin A1C for diabetic, serum cortisol morning and evening, pulmonary function test.

4. Radiological imaging: plain X-Ray chest, pelvi-abdominal Ultrasonography, echocardiography, duplex, upper GIT endoscopy: Each patient was routinely thoroughly evaluated by a multidisciplinary team (nutritionist, endocrinologist, psychologist and surgeon).

Fully informed consent was taken from the patients after discussing with them the operative procedure and the possible intraoperative and postoperative complications.

Procedure: All patients were hospitalized one day before the surgery with anesthetics consultation Blood pressure medications (anti-hypertensive) and heart medications should be taken the day of surgery with a sip of water, insulin should be adjusted at the morning prior to surgery, low molecular weight heparin 40 mg was given to the patient 12 hours before the surgery, antibiotics as CEFTRIXONE 1 gm vial were given to the patient in the operating room.

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

SADIS:

Position of the patient: Proper positioning and securing the patient to the operating table because this surgery is done in an anti-Trendelenburg position. The first part of the operation is performed with the operating table under anti-Trendelenburg position. The surgeon positioned between the legs of the patient; when finished, the table is changed to the horizontal position. The surgeon moves to the left-hand side of the patient to perform the second part of the operation. Sequential compression device and graduated compression stockings are applied to the lower extremities as prophylaxis for deep venous thrombosis.

Steps:

- Creating Pneumoperitoneum.
- Placement of Liver Retractor.
- Sleeve Dissection.
- Duodenal Dissection.
- Side duodeno-ileal anastomosis.
- End of the procedure.

MGB:

Position of the patient: After anesthesia induction the patient is positioned in an anti-Trendelenburg position with splitting of the legs (French position) and abducted arms. The patient was secured well to the operating table in order not to fall during changing of position. After that, sterilization and draping of the area between nipple line and upper thigh was done. The surgeon stood between the patient legs and the assistant to left of the patient, and the camera man to the right of the patient.

Steps:

- Creating Pneumoperitoneum.
- Pouch Dissection.
- Gastrojujenostomy Anastomosis formation.

Postoperative care: Patients received nothing by mouth postoperatively till 4 hours after mobility and started by SIPS of water, then Clear fluids in next day. Encourage early mobilization of the patient with elastic stocking to prevent risk of DVT. Patients received intravenous broad-spectrum antibiotic together with

intravenous PCA to provide more consistent pain relief than intermittent injections. The patients received proton pump inhibitors to avoid stress ulcers. Patients were usually discharged in the third postoperative day. Patients were instructed to follow up four stages (each stage can take from one week to 10 days according to patient capability) diet regimen under supervision of the nutritionists as follow: the first stage, the second stage, the third stage and the fourth stage. More solid food is administrated as patient can tolerate like, steamed rice or pasta, well-cooked skinless chicken and very lean ground minced meat.

Postoperative diet regimen (Diet guidelines): Four to Six meals/day, each meal should not exceed the volume of a measuring cup, eat and drink slowly, don't eat and drink in same time, take small bites and chew very well, avoid red meat, vitamin/mineral daily, drink low calorie liquids between meals at least 6-8 cups/day, avoid raw vegetables and raw fruits, low fat solid diet: chew all food very well, drink only small amounts of water, add one new food at a time, add breads last, and take vitamin/mineral supplement with iron and zinc daily.

Follow-up was carried out on an outpatient basis: Weekly visit for one month after discharge from the hospital then after 6 weeks then follow-up is obtained at 3, 6, 9 and 12 months and then yearly by: BMI, FBS, HbA1c, dose and discontinuation of anti-diabetic medications, dose and discontinuation of anti-hypertensive medications, blood pressure, lipid profile. Postoperative complications as hernia, food intolerance or reflux were recorded. Success rate of surgery was determined according to criteria after 12 months.

Outcomes Assessment: Weight loss depending on the change in BMI which was measured at the initial screening on the day of surgery, 2 weeks at stitch removal and at l, 3, 6, and 12 months after surgery. Intraoperative and postoperative complications (early or late) were recorded for each operation. D.M control by measurement of HbA1c at 3, 6 and 12 months and RBS at 1, 3, 6 and 12 months with follow up of changes in dose or discontinuation of anti-diabetic medications. Hypertension control by measurement of blood pressure at 1, 3, 6 and 12 months with follow up of changes or discontinuation of anti-hypertensive medications. Hyperlipidemia control by lipid profile at 1, 3, 6 and 12 months. We determined the preoperative patient characteristics for each group including age, sex, family history of D.M, BMI loss, type of medication, duration of D.M, and preoperative status of D.M (better control if HbA1c < 8.5% and no history of hyperglycemic complication and less control if HbA1c> 8.5% with repeated emergency department visits for control of hyperglycemia.

Statistical Analysis:

Data were collected, revised, coded and entered to the Statistical Package for the Social Science (SPSS) version 23. The quantitative data were presented as mean, standard deviations and ranges. Also, qualitative variables were presented as number and percentages.

The comparison between groups regarding qualitative data was done by using Chi-square test and/or Fisher exact

test when the expected count in any cell found less than 5.

The comparison between two groups regarding quantitative data and parametric distribution was done by using Independent t-test.

The comparison between more than two paired groups regarding quantitative data and parametric distribution was done by using Repeated Measures ANOVA test.

The confidence interval was set to 95% and the margin of error accepted was set to 5%. The p-value was considered significant when P-value < 0.05.

RESULTS

In comparison between the two groups according to demographic data it was found that no statistically significant difference between them **(Table 1)**.

Table (1): Comparison between groups according to demographic data

Demographic data	Group I (N=25)	Group II (N=25)	P-value
Age (years)			
Mean ± SD	38.52 ± 8.74	37.80 ± 7.43	0.755
Range	26 – 58	26 – 58	
Sex			
Female	17 (68.0%)	19 (76.0%)	0.529
Male	8 (32.0%)	6 (24.0%)	

The progress of group I through periodically assessment of the weight loss and diabetes disease improvement with no statistically significant difference over the periods **(Table 2)**.

Table (2): The extent of the difference over the periods through weight loss and diabetes. improvement in group I

Periods / Parameters	Pre-operative	Post-operative (3 months)	Post-operative (6 months)	Post-operative (12 months)	P-value
Weight loss					
Mean ± SD	137.36±21.85	121.68±14.57	101.31±13.20	78.55±13.97	<0.001
Range	95 - 170	85 - 140	82 - 125	52 - 100	
DM					
HbA1c					
Mean ± SD	8.92 ± 1.19	8.60 ± 0.91	7.76 ± 0.93	6.01 ± 0.56	<0.001
Range	7.5 – 12.7	7 – 10	6 – 9	5 – 8	
FBS					
Mean ± SD	186.80 ± 15.47	128.40 ± 10.28	120.80 ± 13.33	92.01 ± 17.88	<0.001
Range	150 – 210	118 – 154	102 – 147	80 – 140	
HOMA					
Mean ± SD	7.82 ± 1.32	7.30 ± 0.96	6.19 ± 0.94	2.36 ± 1.29	<0.001
Range	6 – 10	6 – 9	5 – 8	1 – 5	
Treatment					
Insulin	9 (36.0%)	3 (12.0%)	0 (0%)	0 (0%)	
Oral	16 (64.0%)	8 (32.0%)	10 (40.0%)	3 (12.0%)	<0.001
Stopped	0 (0.0%)	14 (56.0%)	15 (60.0%)	22 (88%)	

The progress of group II through periodically assessment of the weight loss and diabetes disease improvement showed a statistically significant difference over the periods **(Table 3)**

Table (3): The extent of the difference over the periods through weight loss and diabetes improvement in group II

Periods / Parameters	Pre-operative	Post-operative (3 months)	Post-operative (6 months)	Post-operative (12 months)	P-value
Weight loss					
Mean ± SD	136.90±19.82	122.84±14.94	100.65±14.11	77.35±13.18	<0.001
Range	95 – 170	87 – 145	76 – 130	65 – 105	
DM					
HbA1c					
Mean ± SD	9.56±1.15	8.70±1.00	7.89±1.28	6.03±0.84	<0.001
Range	7.5 – 12.7	7 – 11	6 – 9	5 – 8	
FBS					
Mean ± SD	192.00±17.80	129.96±13.51	127.20±17.20	93.66±34.22	<0.001
Range	150 – 210	122 – 165	110 – 158	85 – 145	
HOMA					
Mean ± SD	8.64±1.25	7.06±1.02	5.76±1.03	2.36±1.19	<0.001
Range	6 – 10	5 – 8	4 – 7	1 – 5	
Treatment					
Insulin	7 (28.0%)	5 (20.0%)	0 (0%)	0 (0%)	
Oral	18 (72.0%)	13 (52.0%)	11 (44.0%)	4 (16.0%)	<0.001
Stopped	0 (0.0%)	7 (28.0%)	14 (56.0%)	21 (84%)	

The two procedures were compared according to operative time and intraoperative complications and the overall outcome of Diabetes disease improvement after one year of follow up and showed no statistically significant difference between the two groups **(Table 4)**.

Table (4): Comparison between groups according to operative time, intraoperative complications and outcome of diabetes improvement

Groups / Operative Data	Group I (N=25)	Group II (N=25)	P-value
Operative Time			
Mean ± SD Range	88 ± 2.35 75 – 100 min	74 ± 5.86 60 – 85 min	<0.001
Intra-operative Complications			
Bleeding: ♣ Less than 150 cc ♣ More than 150 cc	 23 (92.0%) 2 (8.0%)	 24 (96.0%) 1 (4.0%)	0.551
Leakage: (Intraoperative Methyl blue test)	2 (8%)	1 (4%)	0.551
Initiative Pneumoperitoneum Hemodynamic instability	2 (8%)	3 (12%)	0.638
DM Outcome			
Cured	22 (88.0%)	21 (84.0%)	0.684
Transferred from insulin to oral TTT	3 (12.0%)	4 (16.0%)	

The complications that occurred all over study in both groups and its percentage to overall candidates and showed no statistically significant difference between the two groups **(Table 5)**.

Table (5): Post-operative complications in both groups

Complications	Overall cases (%)	Procedure type		P-value
		Group I	Group II	
Leakage	1 (2%)	1 (4.0%)	0 (0.0%)	0.313
Bleeding	2 (4%)	1 (4.0%)	1 (4.0%)	1.000
Mortality	0 (0%)	0 (0.0%)	0 (0.0%)	–
Wound Infection	1 (2%)	0 (0.0%)	1 (4.0%)	0.313
Chest infection	2 (4%)	2 (8.0%)	0 (0.0%)	0.149
Gall Bladder Stones	3 (6%)	1 (4.0%)	2 (8.0%)	0.551
Anemia	6 (12%)	4 (16.0%)	2 (8.0%)	0.384
Hypo-Albuminema	3 (6%)	1 (4.0%)	2 (8.0%)	0.551
Excessive Hair Loss	5 (10%)	2 (8.0%)	3 (12.0%)	0.638
Peripheral Neuritis	1 (2%)	0 (0.0%)	1 (4.0%)	0.313
Dumping	3 (6%)	1 (4.0%)	2 (8.0%)	0.551
Anastomosis Stenosis	0 (0%)	0 (0.0%)	0 (0.0%)	–
Marginal Ulceration	0 (0%)	0 (0.0%)	0 (0.0%)	–
Conversion to Open Surgery	0 (0%)	0 (0.0%)	0 (0.0%)	–
Port Site Hernia	0 (0%)	0 (0.0%)	0 (0.0%)	–

DISCUSSION

Our study included 50 patients during the period from Dec 2018 till Dec 2020, at Al Azhar University Hospitals, Cairo, Egypt. There was higher prevalence of obesity among females than males. The co-morbidities were diabetes mellitus (type II) in 32% who were on insulin treatment and 68% on oral hypoglycemic drugs. Hypertension in 40% were on antihypertensive drugs, dyspnea on excretion in 70%, arthritis in 46%, knee pain in 32% and back pain in 36 %.

Regarding the operative time, in our study the mean operative time was 90 minutes for SADIS and 75 minutes for MGB. As regard hospital stay, the mean postoperative hospital stay was 4 days. In work of *Pernaute et al. (2010)* on 50 patients, the mean hospital stay was 3-7 days. In comparison to a study done by *Mitzman in (2016)* length of hospital stay was 2-4 days.

Regarding to the changes in the BMI in our study, the mean initial BMI for studied patients decreased to its lowest value after one year. Mean excess weight loss was 4% had poor weight loss which was defined to be less than 50% of excess weight loss after one year. They were sweet eater with no family history of obesity.

Pernaute (2012) made case series of 100 patients with morbid obesity or metabolic disease treated with single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S), the mean Excess Weight Loss (EWL calculated from an ideal body mass index [BMI] of 25 kg/m2) was 95% at 12 months.

A study was done by *Pernaute et al. (2015).* on patients with obesity and type 2 diabetes treated with SADI-S, Excess weight Loss (EWL) of the whole series was 73% at 6 months, 91% at first year and 92%, 85%, 88% and 98% in the second to fifth postoperative years. In the follow-up, 6 patients failed to reach 50% EWL (6.1%). Overall weight loss was 31% at 6 months from surgery, 39% at 1year, 39% at 2years, 35% at 3years, 37% at 4 years and 38% at 5years from the operation. They reported in their study that follow up data was available for 50 patients after two years of SADIS. Mean preoperative BMI was 44,2 kg/m2 (ranging from 33 kg/m2 to 67 kg/m2), excess weight loss was 53.6% at 3 months, 81.6% at 6 months, 87.8% at 9 months, 94.7% at 1 year, 98.6% at 18 months, 114% at 2 year.

De Maria et al. (2010) reported on the effect of Mini Gastric Bypass on (BMI) in T2DM patients with preoperative BMIs < 35 kg/m2, in a prospective study showed that so close to our outcomes.

De Sa et al. (2011) the total BMI loss post mini gastric bypass surgery in patients with preoperative BMIs < 35 kg/m2 had the similar results

Regarding weight loss and the decrease in the BMI from the start till the end of the study according to sex, sweet eating and the presence of family history of obesity, there was no significant difference between male and female patients, patients with or without family history of obesity or sweet eaters and non-sweet eaters regarding weight loss and the decrease of the BMI as there were no statistically significant changes.

Intraoperative bleeding was non-significant with an average of 50 cc. However, two cases developed postoperative bleeding. Wound infection was reported in single case. Chest infection was reported in 2 cases. Regarding gall stone disease, 3 cases developed postoperative gall stone and planned for cholecystectomy.

In the present work the major postoperative complications showed leakage rate of 2% Bleeding rate was 4% managed by 2nd look and clipping. And mortality rate was 0%.

Lee and Walsh (2012) stated that conversion rate to open MGB was 0.17%, mortality rate of 0.08%, leaks occurred in 1.08%, the wound hernia rate was 0.08%, and wound infections occurred in 0.12% of patients. Ulcers occurred in 4% of the patients and were treated with medication. Three patients with ulcers failed medical therapy and underwent revision of their MGB.

Regarding gall stones formation, there were 6% who developed gall stones within 1 year of the procedure. This incidence was considered reasonable when compared with the study done by *Moon et al. (2014)* and his colleagues to compare between SG and GB in cholelithiasis after one year. The result was 5.7% of GBP and 6.1% of SG developed symptomatic gallstone.

Regarding postoperative bleeding, 4% had bleeding. In comparison to our study, gastric hemorrhage occurred with one patient in study done by *Pernaute et al. (2015).*

In our study, there were no cases with anastomotic stenosis in comparison to a study done by *Mitzman et al. (2016)* was showed one stricture in the gastric sleeve (which led to dysphagia) needing dilatation regarding to hypo-albuminemia, it occurred with 6%, due to reduced food intake. And 8% patients with clinical hypo-albuminemia. All cases happened between the sixth and 12th postoperative months.

In the late postoperative period, there were 12% who developed anemia, 5 patients (10%) had hair loss, 1 patient 2% developed peripheral neuropathy. there were no cases with anastomotic stenosis or ulceration, internal hernia or bowel habit changes. Dumping syndrome in the late postoperative period was in 6%. Leakage was in one case (2%) was discovered early and managed conservatively with endoscopic stenting.

In our study, regarding to postoperative glucose level after SADIS, mean glucose value returned to normal in all cases (mean glycaemia, 97 mg/dl), although four patients had glycemia over 110 mg/dl only during the first three postoperative months. Glycosylated hemoglobin was below 6.5% in all cases with mean value of 6 %, only 4% maintain reduced dose of anti-diabetic therapy instead of insulin injection 12 months after the operation with normal glycaemia and glycosylated hemoglobin. After the first six postoperative months, no patient is under insulin treatment.

In comparison to the study done by *Pernaute et al. (2010)* the overall diabetes remission rate was 77% at 2 years and 52% at 5 years.

Remission rates were higher for those having oral therapy than for those having

an insulin therapy. Type 2 diabetes recurred in 8% of patients within 5 years.

The mean glycemia level reduced from 167.6 mg/dl at baseline to 93.0 mg/dl at 1-year follow-up and to 101.6 mg/dl at 5-year follow-up. The mean HbA1c level reduced from 7.6% at baseline to 5.1% at 1-year follow-up and to 5.5% at 5-year follow-up. MGB had a strong impact on diabetes remission detected by that the mean FBS drop after one year in MGB (47.80 ± 6.41 mg/dl) and this difference of drop was statistically significant.

The mean HBA1c dropped after one year and this difference of drop was statistically significant. So, only 20% maintained reduced dose of anti-diabetic therapy instead of insulin injection 12 months after the operation with normal glycemia and glycosylated hemoglobin and cases with no remission in DM.

When comparing our outcomes with other studies, the universal published data showed similar results to our study. However, we have noted that remission rates varied from 77% to 88% due to a lack of a consistent definition of diabetes remission. Diabetes remission and the effectiveness of bariatric surgery may have been overestimated.

Padwal et al. (2011) showed marked decrease in levels of total cholesterol, LDL cholesterol and triglycerides after bariatric procedures. Approximately, 70 % of patients experienced an improvement in hyperlipidemia. Hypertension improved or resolved in 79 % of patients.

Ikramuddin et al. (2013) showed that hypertension remission rate was 66% in a prospective study suggesting a hormonal mechanism maybe involved for the changes observed; various neuroendocrine changes have been postulated to play a role in this. The gut peptide glucagon like peptide 1 (GLP-l) has been implicated by some in the early improvement in glycemic control after Bypass

Milone and his colleague (2013) showed high preoperative HbA1C which was determined to be a negative predictor of diabetes remission at 12 months. Also, significant correlations were not detected in the percent change from baseline to 12 months follow up between BMI and blood glucose level after MGB, as well as between BMI and HbA1C changes after MGB.

Yang and his colleagues (2015) reported on the effect of MGB, for T2DM in a prospective study, 77% of patients achieved the ADA target goals of HbA1C<7.0 %, LDL <100 mg/dL and triglycerides <150 mg/dL. And compared between the different gastrointestinal surgeries, (GB, MGB and SG) among the different operative methods, waist circumference and C-peptide levels were determined to be significant predictors for the remission of T2DM in obese patients.

CONCLUSION

The effects of metabolic surgery on the glucose metabolism and weight reduction have a profound impact in treating T2DM. Also, it was a safe solution for carefully selected patients with metabolic syndrome which decrease the risk of cardiovascular and metabolic diseases. Our study suggested that both type of operations “SADIS and MGB’ were very effective in controlling DM.

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دراسة مقارنة بين مميزات جراحة التحويل أحادي التوصيلة لمسار الإثني عشر واللفائفي مع تكميم المعدة وجراحة تحويل مسار المعدة المصغر فى علاج حالات مرض السكري من النوع الثاني المصحوب بالسمنة

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خلفية البحث: أظهرت العديد من الدراسات أن جراحات السمنة تؤدي إلى فقدان الوزن بشكل دائم. و كذلك تحسين وعلاج العديد من الأضرار والأمراض الصحية الناتجة عن خلل عمليات الأيض لدى مريض السمنة بما في ذلك مرض السكري من النوع الثاني، إرتفاع ضغط الدم، إضطراب التنفس أثناء النوم وإرتفاع نسبة الدهون والكوليسترول في الدم.

الهدف من البحث: مقارنة كل من جراحة التحويل أحادي التوصيلة لمسار الإثني عشر واللفائفى مع تكميم المعدة وجراحة تحويل مسار المعدة المصغر كعلاج لمرض السكري النوع الثاني المصاحب بالسمنة المفرطة.

المرضي و طرق البحث: لقد تم أجراء الدراسة علي ٥٠ من مرضي السمنة في الفترة من ديسمبر ٢٠١٨ حتي ديسمبر ٢٠٢٠ ويعانون من مرض السكري النوع الثاني في مستشفيات جامعة الأزهر ومستشفيات أخري. حيث تم تقسيم المرضي الي مجموعتين متساويتين و تم اجراء جراحة التحويل أحادي التوصيلة لمسار الإثني عشر واللفائفى مع تكميم المعدة ل ٢٥ مريض وجراحة تحويل مسار المعدة المصغر للاخرون و مقارنة النتائج علي مدار فترة البحث.

نتائج البحث: تبين أن متوسط خسارة مؤشر كتلة الجسم بعد عام واحد من جراحة التحويل أحادي التوصيلة لمسار الإثني عشر واللفائفى مع تكميم المعدة ٢١.٦ كجم/ م ٢ ± ٢.٠٠٣٤ كجم/ م ٢ مقابل ٢٠.٦ كجم/ م ٢ ± ١.٠٢٣٩ كجم/ م ٢ مع إجراء تحويل المسار المصغر. و تم الشفاء الكامل من مرض السكري في ٨٨٪ من مرضي جراحة التحويل أحادي التوصيلة لمسار الإثني عشر واللفائفى

مع تكميم المعدة مقابل ٨٤٪ من مرضي عملية تحويل المسار المصغر. فيما يتعلق بارتفاع ضغط الدم، تم شفاء ٧٦.٧٪ من مرضي جراحة التحويل أحادي التوصيلة لمسار الإثني عشر واللفائفى مع تكميم المعدة مقابل ٦٦.٥٪ من مرضي تحويل المسار المصغر. فيما يتعلق بارتفاع نسبة الدهون بالدم تم شفاء ٩٢٪ وتحسن في ٨٪ من مرضي عملية جراحة التحويل أحادي التوصيلة لمسار الإثني عشر واللفائفى مع تكميم المعدة مقابل شفاء ٨٨٪، تحسن كبير ب ١٢٪ و تحسن طفيف بنسبة ٨٪ في عملية تحويل المسار المصغر.

الأستنتاج: جراحة التحويل أحادي التوصيلة لمسار الإثني عشر واللفائفى مع تكميم المعدة و جراحة تحويل مسار المعدة المصغر كعلاج لمرض السكري النوع الثاني المصاحب بالسمنة المفرطة يعطي نتائج جيدة جدا مع عدم وجود إختلافات جوهرية أو ملحوظة. و تعتبر حلول أمنة للتخلص من امراض الأيض و تقليل مخاطر الأصابة بامراض القلب و الأيض.

الكلمات الدالة: التحويل أحادي التوصيلة لمسار الإثني عشر، اللفائفي، تكميم المعدة، مسار المعدة المصغر، مرض السكري من النوع الثاني، السمنة.