LIPID PROFILE CHANGES FOLLOWING BARIATRIC SURGERY, A COMPARATIVE STUDY BETWEEN SLEEVE GASTRECTOMY AND MINI-GASTRIC BYPASS

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Rereceived: 12/1/2022
Accepted: 16/2/2022

Online ISSN: 2735-3540

ABSTRACT:

Background: Bariatric surgery proved to be the only successful treatment option leading to long-term weight loss with improvement of obesity related comorbidities. The Laparoscopic Sleeve Gastrectomy (LSG) is now one of the most popular bariatric procedure worldwide with rising prevalence over last decade, while the Mini Gastric Bypass (MGB) is now gaining some popularity as a relatively new bariatric procedure

Aim of the work: to evaluate the effect of two types of bariatric surgery; mini-gastric bypass and sleeve gastrectomy, on lipid profile and compare the results in both groups.

Patients and Methods: This study was carried out on sixty morbidly obese persons suffering dyslipidemia. This included 30 patients underwent mini-gastric bypass (Group1) and 30 patients underwent sleeve gastrectomy (Group2). Patients were evaluated preoperatively and 3 months postoperative regarding their anthropometric data (weight, height, and Body mass index) and total lipid profile (total cholesterol, HDL, LDL and triglycerides).

Results: Baseline preoperative anthropometric measures showed that no statistically significant difference between the two groups. Baseline pre-operative lipid profile measures showed no statistically significant difference between the two groups regarding total cholesterol and HDL levels while there was a significant difference in LDL and triglycerides levels.

It showed that LDL level of patients in (sleeve gastrectomy) group was significantly higher than LDL level of (mini gastric bypass) group (179.33 ± 28.98 mg/dl vs 157.86 ± 31.66 mg/dl respectively) (p value <0.05) while triglycerides level of patients in (mini gastric bypass) group was significantly higher than triglycerides level of (sleeve gastrectomy) group (222.50 ± 56.44 mg/dl vs 188.59 ± 28.92 mg/dl respectively) (p value <0.05).

Three months post-operative anthropometric measures showed that post-operative weight and BMI were significantly higher in mini gastric bypass group than sleeve gastrectomy group (108 ± 14.2 Kg vs 100.98 ± 12.27 Kg and 42.85 ± 4.90 Kg/m2 vs 38.84 ± 4.39 Kg/m2 respectively) (p value <0.05). (Table 4, Figure 7 & 8)

Three months post-operative lipid profile showed no statistically significant difference between the two groups regarding total cholesterol and HDL levels while there was a significant difference in LDL and triglycerides levels

Comparing the two groups regarding amount of change in LDL. It shows that there was a statistically significant difference between pre and post-operative LDL in both groups (p value <0.05), there was a statistically significant difference between two groups regarding mean LDL (p value < 0.05) and there was a statistically significant difference between two groups regarding amount of change in LDL (p value <0.05).

Conclusion: According to our results both laparoscopic techniques; LSG and MGB were effective in achieving significant weight loss and improvement of obesity-associated medical comorbidities; dyslipidemia. Still LSG could be preferred in patients with dyslipidemia. The decrease of LDL, cholesterol and triglycerides being similar to MGB but a higher increase of HDL being documented.

Keywords: *Obesity; Bariatric surgery; Lipid profile; sleeve; gastrectomy; MGB.*

INTRODUCTION:

"Overweight" and "Obesity" refers to abnormal, excessive fat accumulation in an individual's body leading to general health impairment[(1)].

Body mass index (BMI) is the most commonly used parameter to calculate the individual's weight status according to World Health Organization (WHO). BMI higher than or equal to 25 kg/m2 is suggested as overweight and BMI higher than or equal to 30 kg/m2 indicates obesity[(2)]. There are multiple factors playing role in pathophysiology of overweight and obesity including genetics, heredity, environmental and psychological factors, lack of adequate physical activity and hormonal imbalances. The most common factor is the imbalance between calorie intake and expenditure by physical activity[(3)]. Obesity is linked with raised cardiovascular risk factors such as hypertension, type 2 diabetes mellitus and dyslipidemia[(4)]. Obesity is the third preventable cause of death worldwide, following tobacco usage[(4)].

Lipid profile parameters suggesting obesity includes increased serum level of total cholesterol, low-density lipoprotein (LDL) cholesterol, very low-density lipoprotein (VLDL) cholesterol, triglycerides, apolipoprotein B and a reduction in serum high-density lipoprotein (HDL) cholesterol[(5)]. Most patients with obesity present with lipid abnormalities; however, only 20% of the obese patients' population is not showing classical metabolic lipid changes[(6)].

Hyperlipidemia is widely recognized as one of the main co-morbidities in severe obesity. It is therefore not surprising that research and treatment are increasingly focused on lipid profiles in the drive to potentially reduce cardiovascular related disease[(7&8)]. Dyslipidemia is the major risk factor for coronary artery disease. Among obese patients, the estimated prevalence of hypertriglyceridemia is twice as high as in non-obese individuals[(9)].

In addition, the prevalence of so-called "atherogenic dyslipidemia", characterized by the combination of hypertriglyceridemia with high LDL and low HDL, is more prevalent in obese and overweight patients. To avoid the risk of manifestations of atherosclerotic disease, the third report of the National Cholesterol Education Program (NCEP)[(10)] instructs that patients with no other risk factors for coronary heart disease

must maintain serum levels of LDL-cholesterol lower than 130mg/d1, total cholesterol less than 200mg/d1, and triglycerides lower than 150mg/d1. The desirable serum HDL cholesterol level should be greater than 50mg/d1 for women and greater than 40mg /d1 for men.

Dattilo et al.[11] in their study showed that a weight loss of 1 kg leads to reduction in serum total cholesterol by 0.05 mmol/L and LDL cholesterol by 0.02 mmol/L and an increase in HDL cholesterol by 0.009 mmol/L

The most widely accepted management of obesity includes either one of the following alone or combination of them: Diet planning, exercising, behavioral therapy (e.g., treating underlying psychological enablers of eating disorders), pharmaco-therapy and surgical intervention. [12].

Weight-loss surgeries are known collectively as bariatric surgery. This involves making changes in the digestive system to help lose weight. Although it is designed to achieve and sustain substantial weight loss, it was demonstrated by numerous studies to improve obesity-related co-morbidities[13&14]. Bariatric surgery has since evolved to four dominant procedures (Bilio-pancreatic Diversion (BPD), Roux-en-Y Gastric Bypass (RYGBP), Adjustable Gastric Banding, Sleeve Gastrectomy), ranging from largely malabsorptive to completely restrictive. They are regarded as the most effective therapies for treating obesity[15&16]

LSG is now one of the most widespread weight loss surgical procedures in Egypt. LSG is technically less complex procedure with effective weight loss. Other factor to consider LSG superior to MGB is the outcome results stated by Mostafa et al., (2019) who conducted a study in Egypt and reported that after prospectively comparing the two procedures for a year, almost both procedures have near same effect on loss of weight and resolving or better control on co-morbidities as DM, and HTN. However, MGB patients in need for multi-vitamins and minerals costing more than 1500 Egyptian pounds per month[32].

Although weight loss surgery results in significant improvements in serum lipid concentrations[17,18&19], few studies have compared the effect of different surgical techniques on lipid profile changes [20,21&22]. A variety of surgical procedures are available and, currently, it is difficult to identify the most effective option based on patient characteristics and co-morbidities[23].

Type of Study: Comparative study.

Study Setting: The study was conducted at Ain Shams University (ASU) Hospitals.

Study Period: 12 months, onset in January-2020 to February-2021.

Sampling Method: This study was performed on a convenience sample of morbidly obese patients.

Sample Size: 60 morbidly obese patients.

Age: Age group ranges from 20 to 59 years.

Gender: No sex predilection.

Inclusion Criteria: morbidly obese patients who were going to undergo bariatric surgery at El-Demerdash Hospital and have history of dyslipidemia.

Exclusion Criteria: Patients having history of chronic liver disease, liver fibrosis and or having history of drinking alcohol were excluded.

Ethical consideration: A written informed consent was obtained from each participant after explaining the aim of the study & all the procedures that will be done. Privacy & confidentiality were concerned. Approval was obtained from the ethical committee. The study was conducted

according to the stipulations of the ASU ethical and scientific committee.

Study Method: The study included sixty morbidly obese persons suffering dyslipidemia and underwent bariatric surgery at the department of bariatric surgery (department 5&6 general surgery) at El-Demerdash Hospital. The type of the operation to be done was defined by the treating surgeon or selected by the patient.

Study Tools:

Preoperative, interview questionnaire included the following data: name, age, gender, contact number, medical history (dyslipidemia, chronic liver disease and liver fibrosis), previous or current treatments.

Patients were evaluated preoperatively and 3 months postoperative regarding their anthropometric data (weight, height, and Body mass index) and total lipid profile (total cholesterol, HDL, LDL and triglycerides). Laboratory investigation was done at Ain Shams University – Clinical Pathology department

All patients are instructed to follow the general healthy dietary guidelines during the postoperative period (shared with them)

Statistical Analysis: The collected data was coded, tabulated, and statistically analyzed using SPSS program version 25.

Descriptive statistics was done for quantitative data as minimum, maximum and mean ±SD (standard deviation) and for qualitative data as count and percentage.

Student t test was used to compare quantitative data between two independent groups.

Paired samples t test was used to compare quantitative data for the same group before and after intervention.

Chi square test was used to compare qualitative data between different groups.

Repeated measure ANOVA test was used to compare amount of change in quantitative data after intervention between two groups.

P value < 0.05 was considered statistically significant.

RESULTS:

Statistical Results:

The study included 30 patients in each group. (Appendix-1)

Demographic data analysis between the two groups shows that age of patients in (mini gastric bypass) group was significantly higher than age of (sleeve gastrectomy) group (39.47 ± 11.13 years vs 33.67 ± 11.02 years respectively)

(p value =0.05).

No statistically significant difference was found between the two groups regarding sex distribution (Table 1)

Table 1: Gender and age distribution between the two groups

	Total participants	Gender		Age		
		Female	Male	Min	Maximum	Average
Mini gastric bypass	30	25	5	20	59	39.47
Sleeve gastrectomy	30	24	6	15	59	33.67

Comparison between two groups regarding change in anthropometric measures:

Weight:

Comparing the two groups regarding amount of change in weight. It shows that there was a statistically significant difference between pre and post-operative weight in both groups (p value <0.05), there was no statistically significant difference between two groups regarding mean weight (p value > 0.05) and there was a statistically significant difference between two groups regarding amount of change in weight (p value <0.05). (Table 2 and Diagram 1)

Table 2: Comparing the two groups regarding amount of change in weight

		Mini gastric bypass	Sleeve gastrectomy	Test for the effect of time	Test for the effect of group	Test for interaction*
Weight	Preoperative	129.80 ± 17.46	131.65 ± 16.35	<0.001 HS	0.44 NS	<0.001 HS
	3 months Post-operative	108.80 ± 14.20	100.98 ± 12.27			

* Test for interaction = amount of change between the 2 groups

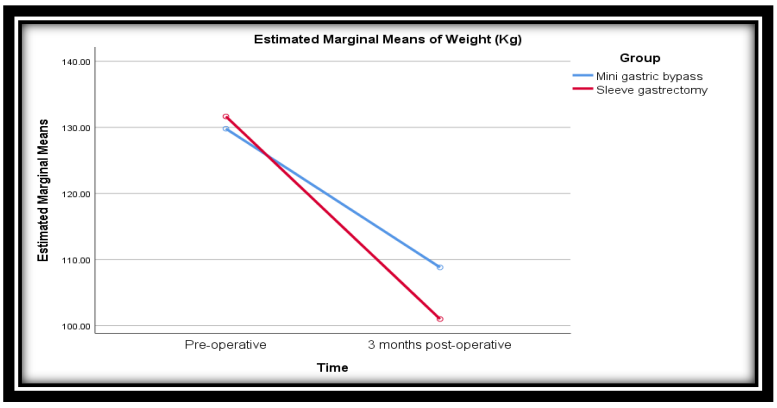

Diagram 1: Estimated marginal means of weight

BMI:

Comparing the two groups regarding amount of change in BMI. It shows that there was a statistically significant difference between pre and post-operative BMI in both groups (p value <0.05), there was no statistically significant difference between two groups regarding mean BMI (p value > 0.05) and there was a statistically significant difference between two groups regarding amount of change in BMI (p value <0.05). (Table 3 and Diagram 2)

Table 3: Comparing the two groups regarding amount of change in BMI

		Mini gastric bypass	Sleeve gastrectomy	Test for the effect of time	Test for the effect of group	Test for interaction
BMI	Preoperative	51.09 ± 5.69	50.61 ± 5.77	<0.001 HS	0.10 NS	<0.001 HS
	3 months Post-operative	42.85 ± 4.90	38.84 ± 4.39			

* Test for interaction = amount of change between the 2 groups

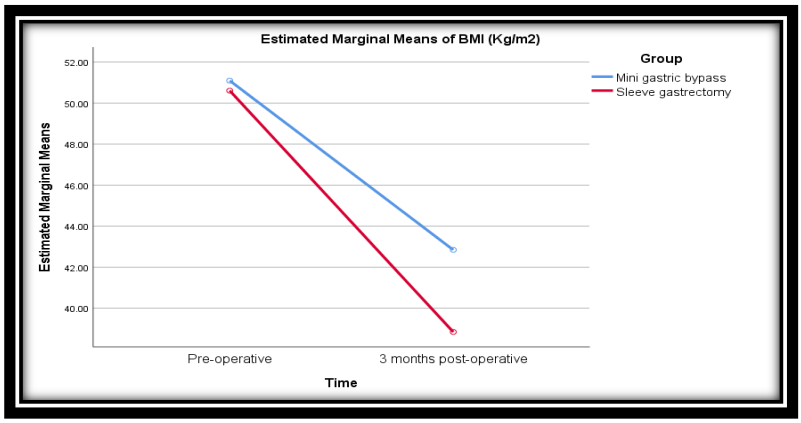

Diagram 2: Estimated marginal means of BMI (Kg/m2)

Comparison between two groups regarding change in lipid profile:

Total cholesterol:

Comparing the two groups regarding amount of change in Total cholesterol. It shows that there was a statistically significant difference between pre and post-operative Total cholesterol in both groups (p value <0.05), there was no statistically significant difference between two groups regarding mean Total cholesterol (p value > 0.05) and there was no statistically significant difference between two groups regarding amount of change in Total cholesterol (p value >0.05). (Table 4 and Diagram 3)

Table 4: Comparison between two groups regarding change in total cholesterol

		Mini gastric bypass	Sleeve gastrectomy	Test for the effect of time	Test for the effect of group	Test for interaction
Total Cholesterol	Preoperative	268.43 ± 52.06	274.83 ± 41.78	<0.001 HS	0.49 NS	0.42 NS
	3 months Post-operative	226.87 ± 43.21	235.81 ± 35.79			

* Test for interaction = amount of change between the 2 groups

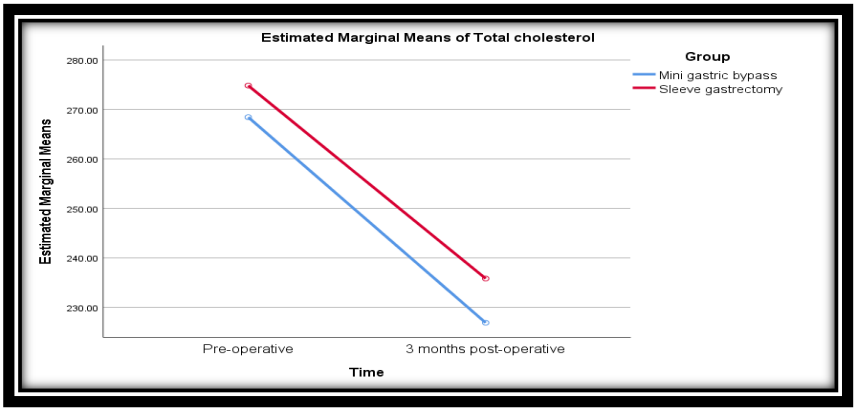

Diagram 3: Estimated marginal means of total cholesterol

HDL

Comparing the two groups regarding amount of change in HDL. It shows that there was a statistically significant difference between pre and post-operative HDL in both groups (p value <0.05), there was no statistically significant difference between two groups regarding mean HDL (p value > 0.05) and there was a statistically significant difference between two groups regarding amount of change in HDL (p value <0.05). (Table 5 and Diagram 4)

Table 5: Comparison between two groups regarding change in HDL.

		Mini gastric bypass	Sleeve gastrectomy	Test for the effect of time	Test for the effect of group	Test for interaction
HDL	Preoperative	34.03 ± 7.60	32.51 ± 5.64	<0.001 HS	0.75 NS	0.001 HS
	3 months Post-operative	37.76 ± 8.83	40.43 ± 6.53			

* Test for interaction = amount of change between the 2 groups

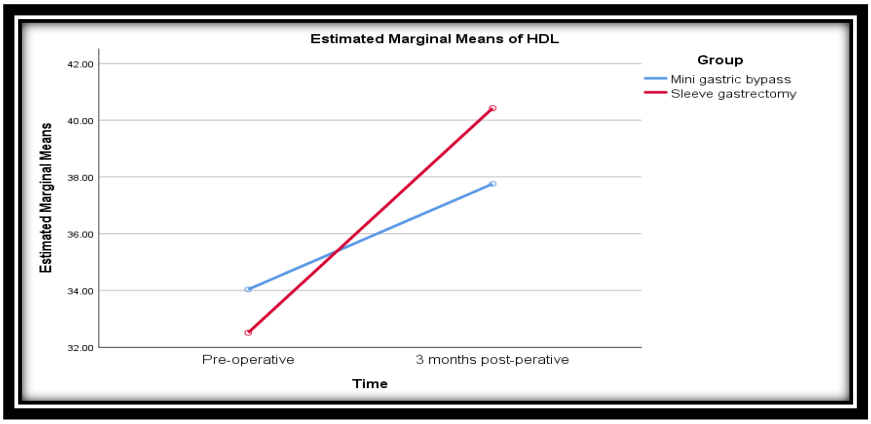

Diagram 4: Estimated marginal means of HDL

LDL:

Comparing the two groups regarding amount of change in LDL. It shows that there was a statistically significant difference between pre and post-operative LDL in both groups (p value <0.05), there was a statistically significant difference between two groups regarding mean LDL (p value < 0.05) and there was a statistically significant difference between two groups regarding amount of change in LDL (p value <0.05). (Table 6 and Diagram 5)

Table 6: Comparison between two groups regarding change in LDL.

		Mini gastric bypass	Sleeve gastrectomy	Test for the effect of time	Test for the effect of group	Test for interaction
LDL	Preoperative	157.86 ± 31.66	179.33 ± 28.98	<0.001 HS	0.01 HS	0.02 S
	3 months Post-operative	133.43 ± 25.73	149.51 ± 22.32			

* Test for interaction = amount of change between the 2 groups

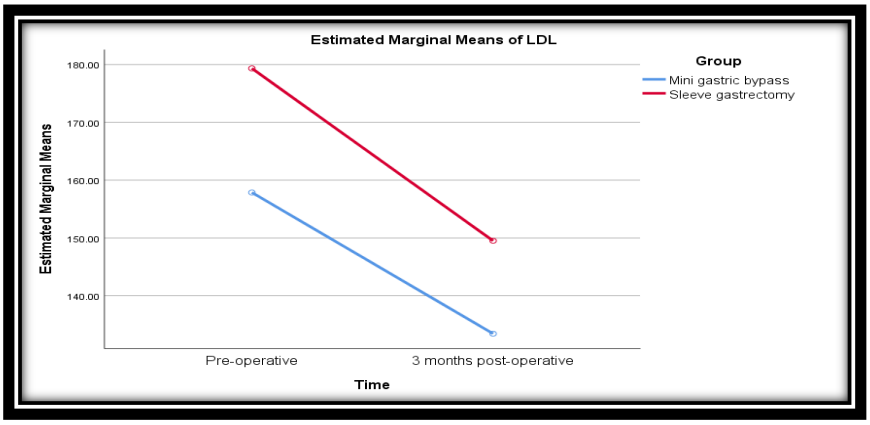

Diagram 5: Estimated marginal means of LDL

Triglycerides:

Comparing the two groups regarding amount of change in Triglycerides. It shows that there was a statistically significant difference between pre and post-operative Triglycerides in both groups (p value <0.05), there was a statistically significant difference between two groups regarding mean Triglycerides (p value < 0.05) and there was a statistically significant difference between two groups regarding amount of change in Triglycerides (p value <0.05) (Table 6 and Diagram 6).

Table 7: Comparison between two groups regarding change in Triglycerides.

		Mini gastric bypass	Sleeve gastrectomy	Test for the effect of time	Test for the effect of group	Test for interaction
TG	Preoperative	222.50 ± 56.44	188.59 ± 28.92	<0.001 HS	0.01 HS	0.01 HS
	3 months Post-operative	169.66 ± 41.14	146.38 ± 22.96			

* Test for interaction = amount of change between the 2 groups

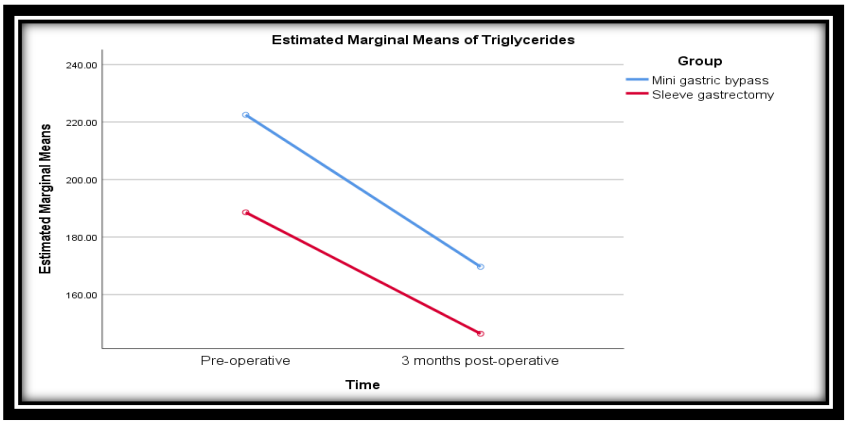

Diagram 6: Estimated marginal means of Triglycerides

DISCUSSION:

In the present study, baseline pre-operative lipid profile measures showed no statistically significant difference between the two groups regarding Total cholesterol and HDL levels while there was a significant difference in LDL and triglycerides levels. It shows that LDL level of patients in (sleeve gastrectomy) group was significantly higher than LDL level of (mini gastric bypass) group (p value <0.05) while triglycerides level of patients in (mini gastric bypass) group was significantly higher than triglycerides level of (sleeve gastrectomy) group (p value <0.05). Still pre-operative data in both groups showed baseline low levels of HDL, hypertriglyceridemia, and increased LDL levels which are frequently seen in obese patients similar to the results reported by Sullivan et al.[24].

All patients are instructed to follow the general healthy dietary guidelines during the postoperative period (Appendix-2)

In the present study, three months post-operative anthropometric measures show that post-operative weight and BMI were significantly higher in mini gastric bypass group than sleeve gastrectomy group (p value <0.05). In agreement to current study, Milone et al.[25] reported that the 3-month post-operative follow-up, there were changes in BMI. MGB patients showed lower changes in BMI as compared with LSG ones.

In the present study, three months post-operative lipid profile show no statistically significant difference between the two groups regarding Total cholesterol and HDL levels while there was a significant difference in LDL and triglycerides levels. It shows that LDL level of patients in (sleeve gastrectomy) group was significantly higher than LDL level of (mini gastric bypass) group (p

value <0.05) while triglycerides level of patients in (mini gastric bypass) group was significantly higher than triglycerides level of (sleeve gastrectomy) group (p value < 0.05). This result matches with previously reported studies by Benetti et al.[26] and Pihlajamäki et al.[27].

In the present study, comparing the two groups regarding amount of change in Total cholesterol. It shows that there was a statistically significant difference between pre and post-operative total cholesterol in both groups (p value <0.05), there was no statistically significant difference between two groups regarding mean Total cholesterol (p value > 0.05) and there was no statistically significant difference between two groups regarding amount of change in Total cholesterol (p value >0.05). In agreement to current study, Benaiges et al.[28] reported that the effect of both techniques on cholesterol levels was apparent from the third month.

In current study, comparing the two groups regarding amount of change in HDL. It shows that there was a statistically significant difference between pre and post-operative HDL in both groups (p value <0.05), there was no statistically significant difference between two groups regarding mean HDL (p value > 0.05) and there was a statistically significant difference between two groups regarding amount of change in HDL (p value <0.05). In agreement to current study, Benaiges et al.[28] reported that changes in lipid profile 1 year after surgery differed between the two study groups. After LRYGB, both techniques achieved a rise in HDL cholesterol levels; however, this increase was more marked after LSG.

In the current study, comparing the two groups regarding amount of change in LDL. It shows that there was a statistically significant difference between pre and post-operative LDL in both groups (p value <0.05), there was a statistically significant difference between two groups regarding mean LDL (p value < 0.05) and there was a statistically significant difference between two groups regarding amount of change in LDL (p value <0.05). Benaiges et al.[28] supported current study by reporting that changes in lipid profile 1 year after surgery differed between the two study groups. After LRYGB, total and LDL cholesterol concentrations fell significantly whereas no significant changes were observed in the LSG group.

In current study, comparing the two groups regarding amount of change in triglycerides. It shows that there was a statistically significant difference between pre and post-operative triglycerides in both groups (p value <0.05), there was a statistically significant difference between two groups regarding mean triglycerides (p value < 0.05) and there was a statistically significant difference between two groups regarding amount of change in triglycerides (p value <0.05). In agreement to current study, Benaiges et al.[28] reported that changes in lipid profile 1 year after surgery differed between the two study groups. After LRYGB, triglyceride concentrations decreased similarly with both surgical procedures.

In conclusion, our findings showed that bariatric surgery improves weight loss and can help with managing or treating co-morbid illnesses through reducing triglyceride level and increasing HDL level, both of which improve patients' long-term cardiac and hepatic status.

According to our results both laparoscopic techniques, LSG and MGB were effective, in achieving significant weight loss and improvement of obesity-associated medical comorbidities i.e. dyslipidemia. In spite that the decrease of

LDL, cholesterol and triglycerides after LSG is similar to MGB still a higher increase of HDL being documented this makes LSG to be the preferred surgery in patients with dyslipidemia. The reason of such difference could be that in LSG, unlike other restrictive techniques, resection of the gastric fundus is performed, after which a reduction in ghrelin has been described (R.S. Gill et al., 2011). Some evidence points to a relationship between ghrelin and HDL metabolism, since the presence of certain single nucleotide polymorphisms in ghrelin may affect HDL concentrations[29,30&31].

Conclusion:

Both studied laparoscopic techniques; LSG and MGB were safe and effective, still short term results showed that LSG could be the preferred operation in patients with dyslipidemia.

The reason is that in spite that the decrease of LDL cholesterol and triglycerides being similar to MGB, a higher increase of HDL being documented

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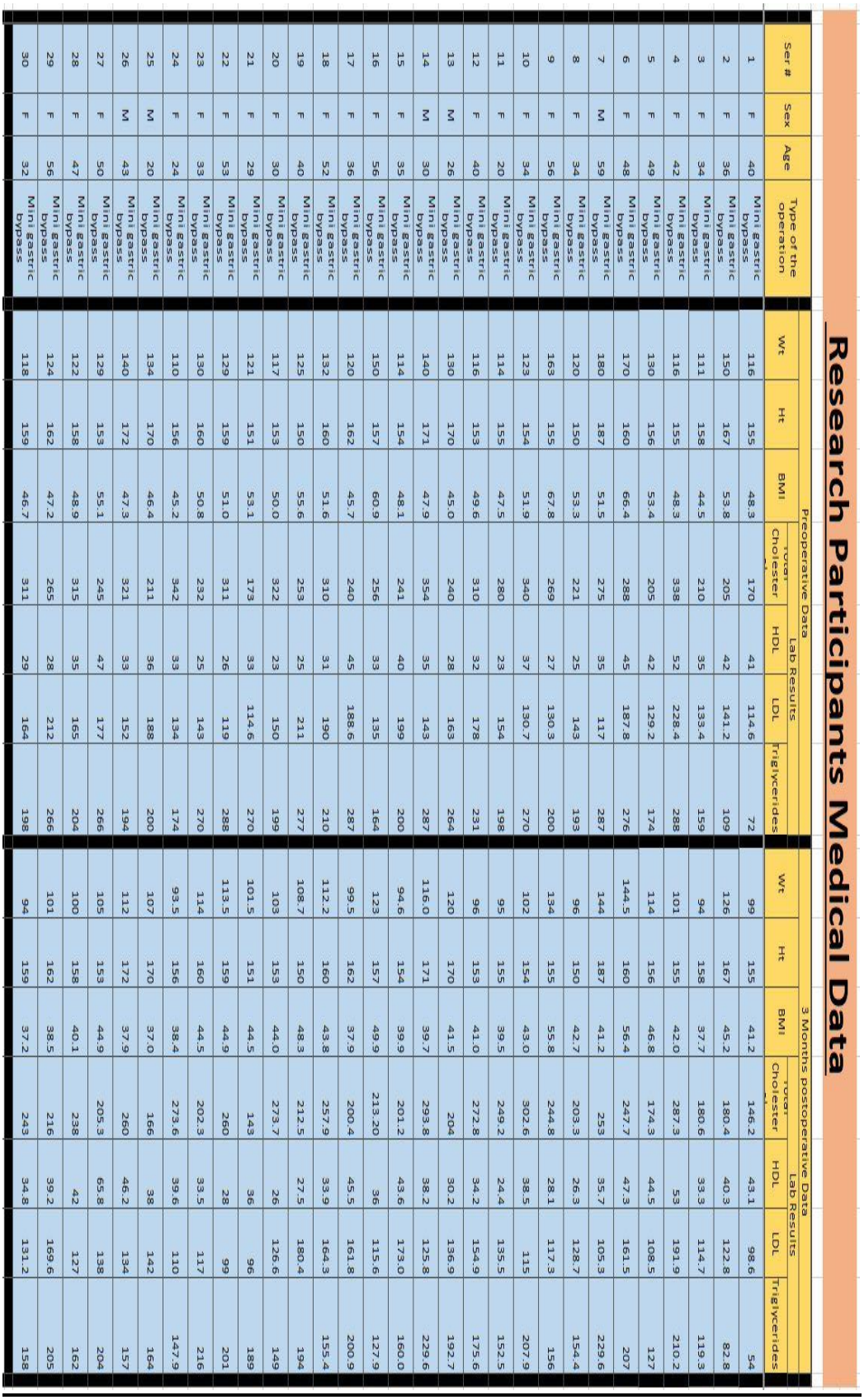
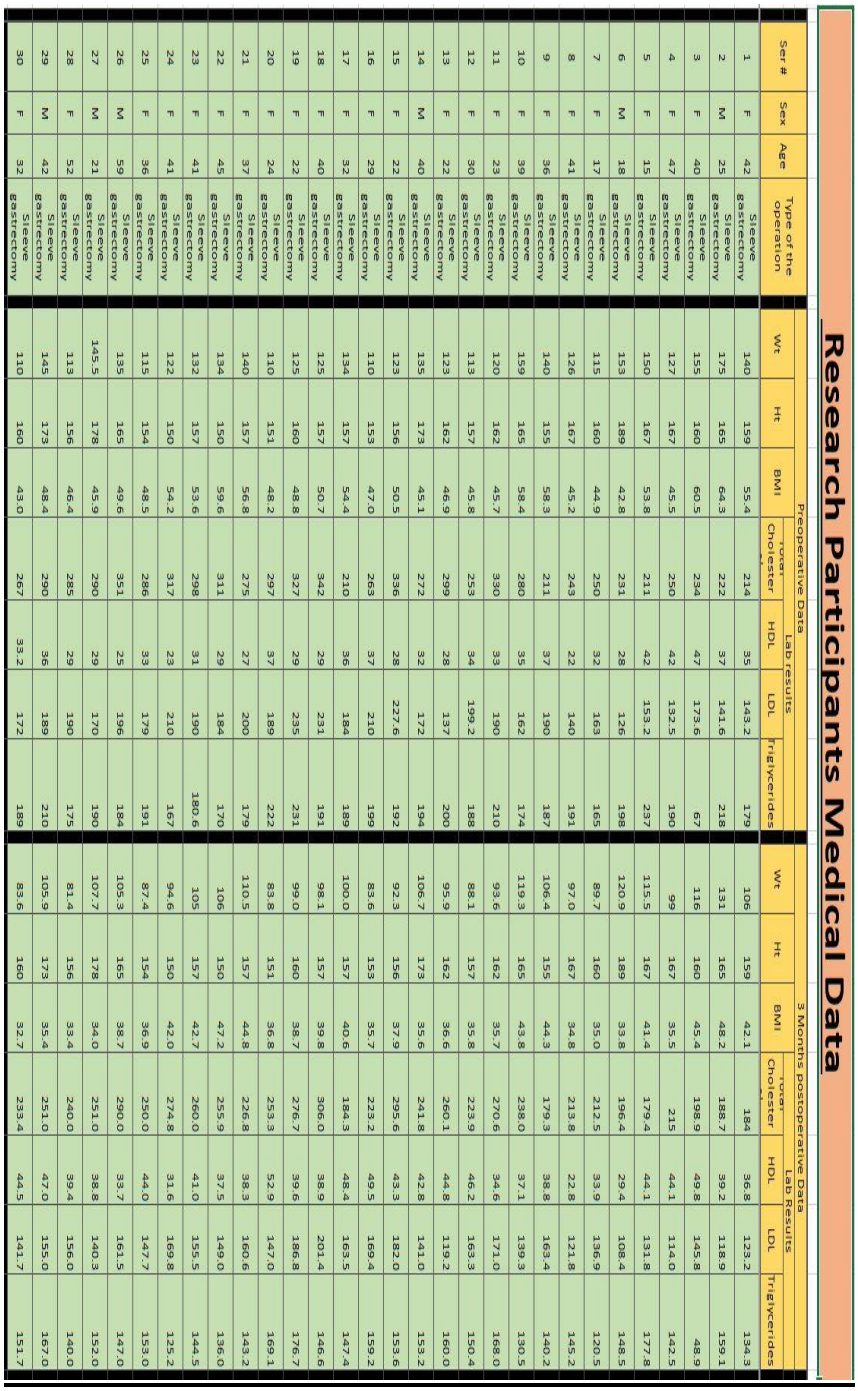
Appendix-1



Research Participants Medical Data

Ser #	Sex	Age	Type of the operation	Preoperative Data						3 Months postoperative Data					
				Wt	Ht	BMI	Lab Results			Wt	Ht	BMI	Lab Results		
							Total Cholesterol	HDL	LDL	Triglycerides				Total Cholesterol	HDL	LDL	Triglycerides
1	F	40	Mini gastric bypass	116	155	48.3	170	41	114.6	72	99	155	41.2	146.2	43.1	98.6	54
2	F	36	Mini gastric bypass	150	167	53.8	205	42	141.2	109	126	167	45.2	180.4	40.3	122.8	82.8
3	F	34	Mini gastric bypass	111	158	44.5	210	35	133.4	159	94	158	37.7	180.6	33.3	114.7	119.3
4	F	42	Mini gastric bypass	116	155	48.3	338	52	228.4	288	101	155	42.0	287.3	53	191.9	210.2
5	F	49	Mini gastric bypass	130	156	53.4	205	42	129.2	174	114	156	46.8	174.3	44.5	108.5	127
6	F	48	Mini gastric bypass	170	160	66.4	288	45	187.8	276	144.5	160	56.4	247.7	47.3	161.5	207
7	M	59	Mini gastric bypass	180	187	51.5	275	35	117	287	144	187	41.2	253	35.7	105.3	229.6
8	F	34	Mini gastric bypass	120	150	53.3	221	25	143	193	96	150	42.7	203.3	26.3	128.7	154.4
9	F	56	Mini gastric bypass	163	155	67.8	269	27	130.3	200	134	155	55.8	244.8	28.1	117.3	156
10	F	34	Mini gastric bypass	123	154	51.9	340	37	130.7	270	102	154	43.0	302.6	38.5	115	207.9
11	F	20	Mini gastric bypass	114	155	47.5	280	23	154	198	95	155	39.5	249.2	24.4	135.5	152.5
12	F	40	Mini gastric bypass	116	153	49.6	310	32	178	231	96	153	41.0	272.8	34.2	154.9	175.6
13	M	26	Mini gastric bypass	130	170	45.0	240	28	163	264	120	170	41.5	204	30.2	136.9	192.7
14	M	30	Mini gastric bypass	140	171	47.9	354	35	143	287	116.0	171	39.7	293.8	38.2	125.8	229.6
15	F	35	Mini gastric bypass	114	154	48.1	241	40	199	200	94.6	154	39.9	201.2	43.6	173.0	160.0
16	F	56	Mini gastric bypass	150	157	60.9	256	33	135	164	123	157	49.9	213.20	36	115.6	127.9
17	F	36	Mini gastric bypass	120	162	45.7	240	45	188.6	287	99.5	162	37.9	200.4	45.5	161.8	200.9
18	F	52	Mini gastric bypass	132	160	51.6	310	31	190	210	112.2	160	43.8	257.9	33.9	164.3	155.4
19	F	40	Mini gastric bypass	125	150	55.6	253	25	211	277	108.7	150	48.3	212.5	27.5	180.4	194
20	F	30	Mini gastric bypass	117	153	50.0	322	23	150	199	103	153	44.0	273.7	26	126.6	149
21	F	29	Mini gastric bypass	121	151	53.1	173	33	114.6	270	101.5	151	44.5	143	36	96	189
22	F	53	Mini gastric bypass	129	159	51.0	311	26	119	288	113.5	159	44.9	260	28	99	201
23	F	33	Mini gastric bypass	130	160	50.8	232	25	143	270	114	160	44.5	202.3	33.5	117	216
24	F	24	Mini gastric bypass	110	156	45.2	342	33	134	174	93.5	156	38.4	273.6	39.6	110	147.9
25	M	20	Mini gastric bypass	134	170	46.4	211	36	188	200	107	170	37.0	166	38	142	164
26	M	43	Mini gastric bypass	140	172	47.3	321	33	152	194	112	172	37.9	260	46.2	134	157
27	F	50	Mini gastric bypass	129	153	55.1	245	47	177	266	105	153	44.9	205.3	65.8	138	204
28	F	47	Mini gastric bypass	122	158	48.9	315	35	165	204	100	158	40.1	238	42	127	162
29	F	56	Mini gastric bypass	124	162	47.2	265	28	212	266	101	162	38.5	216	39.2	169.6	205
30	F	32	Mini gastric bypass	118	159	46.7	311	29	164	198	94	159	37.2	243	34.8	131.2	158



Research Participants Medical Data

Ser #	Sex	Age	Type of the operation	Preoperative Data						3 Months postoperative Data					
				Wt	Ht	BMI	Lab results			Wt	Ht	BMI	Lab Results		
							Cholester	HDL	LDL	Triglycerides				Cholester	HDL	LDL	Triglycerides
1	F	42	Sleeve gastrectomy	140	159	55.4	214	35	143.2	179	106	159	42.1	184	36.8	123.2	134.3
2	M	25	Sleeve gastrectomy	175	165	64.3	222	37	141.6	218	131	165	48.2	188.7	39.2	118.9	159.1
3	F	40	Sleeve gastrectomy	155	160	60.5	234	47	173.6	67	116	160	45.4	198.9	49.8	145.8	48.9
4	F	47	Sleeve gastrectomy	127	167	45.5	250	42	132.5	190	99	167	35.5	215	44.1	114.0	142.5
5	F	15	Sleeve gastrectomy	150	167	53.8	211	42	153.2	237	115.5	167	41.4	179.4	44.1	131.8	177.8
6	M	18	Sleeve gastrectomy	153	189	42.8	231	28	126	198	120.9	189	33.8	196.4	29.4	108.4	148.5
7	F	17	Sleeve gastrectomy	115	160	44.9	250	32	163	165	89.7	160	35.0	212.5	33.9	136.9	120.5
8	F	41	Sleeve gastrectomy	126	167	45.2	243	22	140	191	97.0	167	34.8	213.8	22.8	121.8	145.2
9	F	36	Sleeve gastrectomy	140	155	58.3	211	37	190	187	106.4	155	44.3	179.3	38.8	163.4	140.2
10	F	39	Sleeve gastrectomy	159	165	58.4	280	35	162	174	119.3	165	43.8	238.0	37.1	139.3	190.5
11	F	23	Sleeve gastrectomy	120	162	45.7	390	33	190	210	93.6	162	35.7	270.6	34.6	171.0	168.0
12	F	30	Sleeve gastrectomy	113	157	45.8	253	34	199.2	188	88.1	157	35.8	223.9	46.2	163.3	150.4
13	F	22	Sleeve gastrectomy	123	162	46.9	299	28	137	200	95.9	162	36.6	260.1	44.8	119.2	160.0
14	M	40	Sleeve gastrectomy	135	173	45.1	272	32	172	194	106.7	173	35.6	241.8	42.8	141.0	153.2
15	F	22	Sleeve gastrectomy	123	156	50.5	336	28	227.6	192	92.3	156	37.9	295.6	43.3	182.0	153.6
16	F	29	Sleeve gastrectomy	110	153	47.0	263	37	210	199	83.6	153	35.7	223.2	49.5	169.4	159.2
17	F	32	Sleeve gastrectomy	134	157	54.4	210	36	184	189	100.0	157	40.6	184.3	48.4	163.5	147.4
18	F	40	Sleeve gastrectomy	125	157	50.7	342	29	231	191	98.1	157	39.8	306.0	38.9	201.4	146.6
19	F	22	Sleeve gastrectomy	125	160	48.8	327	29	235	231	99.0	160	38.7	276.7	39.6	186.8	176.7
20	F	24	Sleeve gastrectomy	110	151	48.2	297	37	189	222	83.8	151	36.8	253.3	52.9	147.0	169.1
21	F	37	Sleeve gastrectomy	140	157	56.8	275	27	200	179	110.5	157	44.8	226.8	38.3	160.6	143.2
22	F	45	Sleeve gastrectomy	134	150	59.6	311	29	184	170	106	150	47.2	255.9	37.5	149.0	136.0
23	F	41	Sleeve gastrectomy	132	157	53.6	298	31	190	180.6	105	157	42.7	260.0	41.0	155.5	144.5
24	F	41	Sleeve gastrectomy	122	150	54.2	317	23	210	167	94.6	150	42.0	274.8	31.6	169.8	125.2
25	F	36	Sleeve gastrectomy	115	154	48.5	286	33	179	191	87.4	154	36.9	250.0	44.0	147.7	153.0
26	M	59	Sleeve gastrectomy	135	165	49.6	351	25	196	184	105.3	165	38.7	290.0	33.7	161.5	147.0
27	M	21	Sleeve gastrectomy	145.5	178	45.9	290	29	170	190	107.7	178	34.0	251.0	38.8	140.3	152.0
28	F	52	Sleeve gastrectomy	113	156	46.4	285	29	190	175	81.4	156	33.4	240.0	39.4	156.0	140.0
29	M	42	Sleeve gastrectomy	145	173	48.4	290	36	189	210	105.9	173	35.4	251.0	47.0	155.0	167.0
30	F	32	Sleeve gastrectomy	110	160	43.0	267	33.2	172	189	83.6	160	32.7	233.4	44.5	141.7	151.7

2-Appendix

Post-operative nutritional guidelines

There are four stages to your diet plan. You will start with stage 1 and progress to stage 4. If you have problems—like throwing up or feeling sick at your stomach—you may need to go back to an earlier stage. For example, if you are having problems with solid foods, step back to a pureed diet. If you are having problems with the pureed diet, go back to liquids. Then, slowly move to the next stage in your diet.

The first stage - Fluid phase (first 1-2 weeks after surgery):

All drinks should be smooth (no lumps or crumbs) and drinkable. Start with sips and if you feel comfortable increase the amount

in each sip. Be careful not to swallow large amounts of your drink as this may cause vomiting.

Make it a goal to drink two and a half to three litters each day to avoid dehydration. At least a litter or a litter and a half of it should be nutritious fluids (see below). Avoid soft drinks.

Coffee, tea (without caffeine) and water are safe to drink but make sure you drink them in addition to, not a substitute for, nutritious beverages (see below).

Nutritious drinks:

- Skimmed or low-fat milk fortified with skimmed milk powder (one or two tablespoons per hundred ml)
- Fruit mixed with milk: Homemade is the best. The ones sold are high in sugar.
- Unsweetened fruit juice (restrict to one to two small glasses daily)

When you're ready, move on to stage two for a week or two

The second stage - Finely blended/pureed food (the third week):

1. You should still avoid lumps in your food during this stage. Make sure your food is mixed well.
2. The goal is to reach the density of the yogurt.
3. Eat four to six meals a day.
4. Start with 2-3 tablespoons at a time and gradually increase as you feel comfortable (to 4-6 tablespoons)
5. Chew food well and eat it slowly.
6. Stop as soon as you feel full.
7. Do not drink liquids while eating. Wait at least 30 minutes after you finish eating to drink anything.
8. Make sure your meal contains a source of protein, this is important to help you recover.

When you are ready, go to the third stage

The third stage - Soft foods (4th week):

The texture that you will be eating at this point is pureed food that you can eat with a fork or spoon.

1. You don't need to add milk or fruit juice because you will be eating normal food.
2. Large pieces are allowed now! It is important to chew your food well and slow down while eating your meal.
3. You should reduce meals per day to three or four (and the fourth could be a light meal) and avoid eating between them. Get yourself used to the routine of three meals a day, even if you are not hungry at the time, this will help you lose weight in the long run.
4. Keep drinking fluids farther from eating.

The fourth stage - Regular food (approximately five weeks after surgery):

Your goal will be three meals a day and one or two snacks between meals.

The long-term goal is to have three servings each, one the size of a cup of tea, and a serving in the middle of a piece of fruit or yoghurt.

You don't have to add liquids that contain calories or protein, no milk, skimmed milk powder, or fruit juice

You may like the idea of skipping some foods because you are not hungry to speed up the process of losing weight, but this will lead to you getting used to unhealthy food behaviours and eating a lot in the next meal, and your food should include all the types of regular foods (and remember to chew them well). If it is a new food, put a very small amount in your mouth and chew well.

The post-operative short guide to a healthy lifestyle:

1. Eat 3 small meals a day with 2 protein snacks in between.
2. Four tablespoons of solid food, or four ounces by weight (8 tablespoons) of food at a meal.

This is a satiating portion per meal for the first months after surgery. Always weigh every meal
3. Choose your food wisely as your stomach space is limited.
4. Natural foods are better than canned.
5. Start every meal with protein.
6. Avoid white carbs
7. Your meals should be high in protein and low in fats and carbohydrates.
8. Do not drink soft drinks
9. Don't drink caffeinated drinks
10. Do not do anything else while eating; avoid distractions
11. Be mindful of every bite.
12. Eat slowly (Take your meal in 30 minutes).
13. Chew your food until it reaches the consistency of applesauce.
14. Drink at least 4 cups of zero-calorie fluids every day between meals
15. Exercise is one of the basics of losing weight. Get up and move!

تغير مستوى دهون الدم المصاحب لعمليات علاج السمنة

دراسة مقارنة بين التأثير المصاحب لعملية تكميم المعدة و عملية المجازة المعدية

منيهام محمود و رندة رضا مبروك و علاء عباس و امنية محمد

المقدمة : أصبحت السمنة مرضا وبائيا. ترتبط المضاعفات الجسدية والنفسية والاقتصادية بالسمنة مما يؤدي إلى صعوبة رعاية مرضى السمنة من قبل الأطباء على مستوى العالم. يتم تشخيص السمنة من خلال مؤشر كتلة الجسم.

ترتبط السمنة بارتفاع عوامل الخطر القلبية الوعائية مثل ارتفاع ضغط الدم ومرض السكري من النوع ٢ وخلل شحميات الدم. تشمل تشوهات البروتين الدهني المرتبط بالسمنة زيادة مستوى الكوليسترول الكلي في الدم ، وكوليسترول البروتين الدهني منخفض الكثافة، وكوليسترول البروتين الدهني منخفض الكثافة، والدهون الثلاثية ، وانخفاض كوليسترول البروتين الدهني عالي الكثافة في الدم.

وقد وصفت على نطاق واسع فعالية إجراءات جراحة السمنة المختلفة في تخفيف الوزن وتحسين التوازن في مستوى نسبة السكر في الدم. في المقابل ، لا ي عرف سوى القليل عن تأثيرات جراحات السمنة على تحسين مستوي دهون الدم.

في هذه الدراسة قمنا بتقييم تأثير نوعين من جراحات السمنة ، تكميم المعدة و عملية المجازة المعدية ، على تحسين مستوي دهون الدم.

الهدف : تهدف الدراسة إلى تقييم تأثير نوعين من جراحات السمنة ؛ المجازة المعدية المصغرة وتكميم المعدة ، على ملف الدهون ومقارنة النتائج في كلا المجموعتين

المرضى: أجريت هذه الدراسة على ستين شخصاً يعانون من السمنة المفرطة مقسمة إلى مجموعتين) :المجموعة (1: شملت 30مريضاً خضعوا لعملية تحويل مسار المعدة المصغر ،)المجموعة :(2شملت 30مريضاً خضعوا لعملية تكميم المعدة.

النتائج: نتائج هذه الدراسة تشير إلى أنه كلا تقنيات تحويل مسار المعدة المصغر و تكميم المعدة آمنة وفعالة ، وأظهرت النتائج على المدى القصير أن تكميم المعدة يمكن أن تكون العملية المفضلة في المرضى الذين يعانون من خلل مستوى الدهون في الدم.

والسبب هو أنه على الرغم من أن انخفاض كوليسترول LDL والدهون الثلاثية مشابه لـ تحويل مسار المعدة المصغر ، إلا أنه تم توثيق زيادة أعلى في HDL.