Al-Azhar International Medical Journal

Volume 4 | Issue 10 Article 43

2023

Section: General Surgery

Comparative Study Between Effect Of laparoscopic Sleeve Gasterecomy And Laparoscopic Mini Gastric Bypass On Cholesterol And Triglycerides In Obese Patients

Mostafa Mahmoud Ismail Elmohr
Faculty of Medicine– Al Azhar University, drmosmohr4@gmail.com

Mohamed Ibrahim Al Anany
Faculty of Medicine– Al Azhar University

Ahmed Abd El Aal Sultan
Faculty of Medicine– Al Azhar University

Follow this and additional works at: https://aimj.researchcommons.org/journal

Part of the Medical Sciences Commons, Obstetrics and Gynecology Commons, and the Surgery Commons

How to Cite This Article

Elmohr, Mostafa Mahmoud Ismail; Anany, Mohamed Ibrahim Al; and Sultan, Ahmed Abd El Aal (2023) "Comparative Study Between Effect Of laparoscopic Sleeve Gasterecomy And Laparoscopic Mini Gastric Bypass On Cholesterol And Triglycerides In Obese Patients," *Al-Azhar International Medical Journal*: Vol. 4: Iss. 10, Article 43.
DOI: https://doi.org/10.58675/2682-339X.1986

This Original Article is brought to you for free and open access by Al-Azhar International Medical Journal. It has been accepted for inclusion in Al-Azhar International Medical Journal by an authorized editor of Al-Azhar International Medical Journal. For more information, please contact dryasserhelmy@gmail.com.

ORIGINAL ARTICLE

Comparative Study Between the Effect of Laparoscopic Sleeve Gasterecomy and Laparoscopic Mini Gastric Bypass on Cholesterol and Triglycerides in Obese Patients

Mostafa Mahmoud Ismail Elmohr*, Mohamed Ibrahim Al Anany, Ahmed Abd Elaal Sultan

General Surgery, Faculty of Medicine, Al Azhar University, Cairo, Egypt

Abstract

Background: **Only bariatric surgery has been demonstrated to produce sustained weight loss and alleviation of obesity-related health complications named laparoscopic sleeve gastrectomy and mini gastric bypass.**

Objectives: **To assess the effects of the two surgical procedures of bariatric surgery, mini gastric by bass (MGB), and sleeve gastrectomy on total cholesterol (HDL-LDL) and TG, and to compare the findings among the two groups.**

Patients and methods: **This research was performed on 24 morbidly obese individuals with dyslipidemia. This includes 12 cases that underwent MGB (Group one) and 12 cases (Group two), who underwent sleeve gastrectomy. The anthropometric data and lipid profile of patients were evaluated preoperatively and 2months postoperatively.**

Results: **Preoperative baseline anthropometric, lipid profile measurements showed no difference among the two groups statistically. There was no statistical difference among the two groups in total cholesterol and HDL levels, but there was statistical difference among the two groups in LDL and TG levels. Six months after surgery, anthropometric measurements showed no statistical variation. There was no statistical variance in total cholesterol and HDL levels among the two groups 6 months after surgery, but there was a considerable statistical variance in LDL and triglyceride levels.**

Conclusion: **Both laparoscopic procedures, LSG and MGB, are equally successful in producing substantial weight reduction and improvement in the medical complications linked to obesity.Even so, LMGB may be the better choice for people with dyslipidemia. Total cholesterol, LDL cholesterol, and triglyceride reductions are comparable to LSG, whereas HDL rise is more pronounced in LMGB.**

Keywords: Bariatric surgery, Cholesterol and triglycerides, Mini gastric by bass, Obesity, Sleeve gasterectomy

1. Introduction

WHO estimates that around 2 billion persons are at least somewhat overweight globally, and this number has steadily risen over the last few decades. Those with a BMI of 25 or above are considered overweight, while an additional 500 million people are considered obese mainly because of low physical activity and excessive calorie intake. Obesity and excess fat are connected with several health problems, including DM, cardiovascular disease, osteoarthritis, sleep apnea, and even cancer.[1]

Obesity therapies mostly consist on advising patients to make changes to their lifestyles (such as eating better and exercising more). Yet, most people who try to make lifestyle changes end up regaining any weight they lose within 5 years.[1]

Cardiovascular and neuropsychiatric adverse effects prompted the recent withdrawal of the drugs sibutramine and rimonabant as treatments for obesity. Orlistat, an intestinal lipase inhibitor, is the

Accepted 6 June 2023.
Available online 22 February 2024

* Corresponding author.
E-mail address: Drmosmohr4@gmail.com (M.M.I. Elmohr).

https://doi.org/10.58675/2682-339X.1986
2682-339X/© 2023 The author. Published by Al-Azhar University, Faculty of Medicine. This is an open access article under the CC BY-SA 4.0 license (https://creativecommons.org/licenses/by-sa/4.0/).

sole FDA-approved pharmaceutical therapy for obesity. A comprehensive evaluation of randomized clinical trials found that 60% of individuals on orlistat experienced >5% weight loss after 1 year of therapy, yet this only leads to a little decrease in body weight.[2]

Several treatment approaches have been offered for the management of obesity. Just about 56% of excess body weight may be lost through intensive lifestyle modifications. However, the beneficial effect on cardiovascular risk cannot be sustained over the long term. Surgery for weight loss has been demonstrated to achieve a success method of losing weight in a number of trials. Patients with a BMI of more than 40 continue to benefit best from bariatric surgery.[2]

When it comes to maintaining weight reduction, by two mechanisms, bariatric surgeries can be restrictive, malabsorptive, or a combination of the two. Serum total cholesterol, LDL cholesterol, VLDL cholesterol, TG, apolipoprotein B, and TG levels are all higher in obese people, but serum HDL cholesterol levels are lower.[3]

Many fat people have yet, only 20% of the obese population has abnormal lipid levels. does not exhibit the basic metabolic lipid alterations.[4]

One of the most common complications of extreme obesity is hyperlipidemia. Because of this, lipid profiles have become a major area of study and therapy in an effort to lower the hazards of cardiovascular dysfunction.[5]

The leading cause of heart attack and stroke is dyslipidemia. The estimated prevalence of hypertriglyceridemia is around double that is seen in nonobese persons among obese patients.[6]

Hypertriglyceridemia, high levels of LDL, and low levels of HDL are hallmarks of the so-called 'atherogenic' dyslipidemia, which is more common in obese and overweight people. The National Cholesterol Education Program (NCEP) has released its 3rd report on reducing the prevalence of atherosclerotic disease and its symptoms.[7]

It has been reported that people without additional risk factors for cardiovascular disease have their LDL cholesterol below 130 (mg/dl); their total cholesterol is below 200 (mg/dl), and their TG is below 150 (mg/dl). Serum HDL cholesterol levels of 50 mg/d1 or higher are recommended for women, while 40 mg/d1 or higher are recommended for males. LDL cholesterol is decreased by 0.02 mmol/l, HDL cholesterol is elevated by 0.009 mmol/l, and serum total cholesterol is decreased by 0.05 mmol/l.as shown in a research by Smith Jr, Sidney C.[7]

Food planning, exercise, behavioral treatment (for example, correcting underlying psychological issues, facilitators of disordered eating), medication, and surgical treatment are all well-acknowledged methods of managing obesity.[8]

Bariatric surgery is a broad term for procedures intended to help people lose weight. Altering one's digestive habits can aid weight loss. Despite its focus on long-term weight loss, it has been revealed in many trials.[9]

Changes in lipid profiles as a result of surgery have been the subject of very few researches. Despite the fact that serum lipid concentration improves dramatically after weightloss surgery, there is a wide range of surgical options, and it is currently challenging to determine which one would yield the best results for a given patient, taking into account their individual traits and any comorbidities they may have.[10]

Type of Study: Comparative research.

Study Setting: The research was carried out at the Al-Azhar University Hospitals' Department of General Surgery, Egypt.

Study Period: 6 months, onset from May 2022 to November 2022.

Sampling Method: This prospective, randomized study conducted at the Department of General Surgery. Patients of morbid obesity were included in the study at Al-Azhar University Hospitals in Egypt, and cases were chosen from the hospital's surgical inpatients. All these patients had been morbidly obese for at least 5 years, as defined by a BMI of more than 40 kg/m^2 with comorbidities associated with obesity or not, or more than 35 kg/m^2 with comorbidities due to obesity, and they all had failed trials of conservative therapy.

1.1. Target population

Group 1 includes 12 cases who had mini gastric bypass.

Group 2 includes 12 patients who had a sleeve gastrectomy.

1.2. Inclusion criteria

Those with a BMI of 40 or more were included; those with a BMI of 35 or more with comorbidities included heart disease, high cholesterol, diabetes, high blood pressure, and arthritis.

1.3. Exclusion criteria

Previous patients with bariatric operation, as well as those who have undergone any form of upper gastrointestinal procedure (open or laparoscopic) with the exception of cholecystectomy, were included. Individuals with hiatus hernias, endocrine causes of obesity, surgical ineligibility, excessive sugar consumption, substance abuse or dependence, mental illness, age >60 years, or age <18 years were also not allowed to participate.

1.4. Statistical analysis

Where applicable, data was statistically characterized using measures of central tendency (mean ± SD), dispersion (median, range), or frequency Cases, a proportion; Student's t-test for independent samples was used in contrasting numerical variables between the research groups. The Chi-squared test was used to compare sets of discrete categories. When the predicted occurrences was less than 5, an exact test was performed instead. A probability level of less than 0.05 was thought to be statistically relevant. IBM SPSS (Statistical Program IBM Corp., Armonk, NY, USA) edition for the Social Science 25 for Software by Microsoft was used for all statistical analysis.

2. Results

The participants were divided into two groups: patient's according to choice and dietary considerations:

Group one: 12 patient candidates for Laparoscopic Mini Gastric Bypass.

This group included eight females (67%) and four males (33%) with a mean age of 39.6 ± 8.09, mean weight of 142.8 ± 11.273, mean BMI of 50.7 ± 1.815, mean TG of 219,60 ± 43,35 (mg/dl), mean LDL (mg/dl) of 155.75 ± 29.55, mean HDL of 26 ± 51.20 (mg/dl), and mean TC of 263.83 ± 41.25(mg/dl).

Group two: 12 patient candidates for laparoscopic Sleeve Gastrectomy.

This group included nine females (75%) and three males (25%) with a mean age of 38.6 ± 7.55, mean weight of 141.8 ± 9.407, mean BMI of 51.4 ± 4.072, mean TC of 269.83 ± 41.37 (mg/dl), mean LDL (mg/dl) of 175.25 ± 26.88, mean HDL of 31.30 ± 7.20 (mg/dl), and mean TG of 184.64 ± 19.63 (mg/dl).

The results of this study are shown in the following tables:

Tables 1–8.

Table 1. Comparison of Age and gender among the researched groups.

Group	MGB	Sleeve	*P* value
Age (yrs)	39.6 ± 8.09	38.64 ± 7.55	0.667*
Male	4 (33%)	3 (25%)	0.747*
Female	8 (67%)	9 (75%)	0.747*

*There was no statistically significant difference between studied groups as regard Age.

Table 2. Statistical difference among the two groups as regards baseline clinical data.

Group	MGB	Sleeve	*P* value*
	Mean ± SD	Mean ± SD	
Weight (kg)	142.8 ± 11.27	141.8 ± 9.4	0.735
Height (cm)	167.72 ± 6.3	166.48 ± 4.58	0.431
BMI	50.7 ± 1.8	51.4 ± 4.07	0.467

*There was no statistically significant difference as regards baseline clinical data.

Table 3. Contrasting different study groups preoperatively as regards Comorbidities and baseline characteristics of study participants as regards Lipid Profile.

Group	MGB (*N* = 12)	Sleeve (*N* = 12)	*P* value*
Total Cholesterol (mg/dl)	8 (66.7%)	7 (58.3%)	0.431
Triglycerides (mg/dl)	8 (66.7%)	7 (58.3%)	0.431
Total Cholesterol (mg/dl)	263.83 ± 41.25	269.83 ± 41.37	0.563
LDL Cholesterol (mg/dl)	155.75 ± 29.55	175.25 ± 26.88	0.975
HDL Cholesterol (mg/dl)	26.51 ± 4.20	31.30 ± 7.20	0.863
Triglycerides (mg/dl)	43.35 ± 219.60	184.64 ± 19.63	0.798

*There was no statistically significant difference between two studied groups in total cholesterol and HDL cholesterol while there were statistically significantly different between two studied groups in LDL Cholesterol and Triglycerides.

Table 4. Comparison between different clinical data before surgery and 6 months after LMGB operation among group I.

	Before		After		P value*
	Mean	±SD	Mean	±SD	
Weight	142.8	11.27	109.03	8.84	<0.001
BMI	50.7	1.8	38.7	1.8	<0.001

*There was a high statistically significant difference between studied group I as regard weight in kg, BMI before and after MGB operation.

Table 5. Comparison between different clinical data before surgery and 6 months after LSG operation among group II.

	Before		After		P value*
	Mean	±SD	Mean	±SD	
Weight	141.8	9.407	122.5	11.502	<0.001
BMI	51.4	4.072	44.4	4.072	<0.001

*There was a high statistically significant difference between studied group II as regard Weight in kg, BMI before and after sleeve gastrectomy operation.

Table 6. Comparison between comorbidities before surgery and 6 months after LMGB operation among group I.

Group	MGB (N = 12)		P value*
	Before	After	
Total cholesterol (mg/dl)	263.83 ± 41.25	221.25 ± 43.15	<0.001
LDL cholesterol (mg/dl)	155.75 ± 29.55	131.40 ± 5.20	<0.001
HDL cholesterol (mg/dl)	26.51 ± 4.20	37.35 ± 6.30	<0.001
Triglycerides (mg/dl)	219.60 ± 43.35	143.14 ± 22.55	<0.001

*There was a high statistically significant difference between studied group I as regard comorbidities (Total Cholesterol, LDL Cholesterol HDL Cholesterol and Triglycerides) before and after LMGB operation.

Table 7. Comparison among lipid profile before surgery and 6 months after Laparoscopic sleeve gastrectomy operation.

Group	Sleeve (N = 12)		P value*
	Before	After	
Total cholesterol (mg/dl)	269.83 ± 41.37	230.81 ± 35.25	<0.001
LDL cholesterol (mg/dl)	175.25 ± 26.88	147.55 ± 22.45	<0.001
HDL cholesterol (mg/dl)	31.30 ± 7.20	34.76 ± 5.15	<0.001
Triglycerides (mg/dl)	184.64 ± 19.63	166.44 ± 41.17	<0.001

*There was a high statistically significant difference between studied group II as regard lipid profile (Total Cholesterol, LDL Cholesterol HDL Cholesterol and Triglycerides) before and after Laparoscopic sleeve gastrectomy operation.

Table 8. Comparison between lipid profile in MGB operation and sleeve gastrectomy operation.

Group	MGB (N = 12)	Sleeve (N = 12)	P value*
Total cholesterol (mg/dl)	221.25 ± 43.15	230.81 ± 35.25	<0.05
LDL cholesterol (mg/dl)	131.40 ± 5.20	147.55 ± 22.45	<0.05
HDL cholesterol (mg/dl)	37.35 ± 6.30	34.76 ± 5.15	<0.05
Triglycerides (mg/dl)	143.14 ± 22.55	166.44 ± 41.17	<0.05

*There was no statistically significant difference between two studied groups in total cholesterol and HDL cholesterol while there were statistically significantly different between two studied groups in LDL Cholesterol and Triglycerides.

3. Discussion

Overall cholesterol and HDL levels were not statistically different among the two groups in the current investigation, although there was a major variance in LDL and TG levels. The results show that LDL levels of cases in the sleeve gastrectomy group were statistically higher than the LDL levels of cases in the mini gastric by bass (MGB) group, while the TG levels of patients in the MGB group were statically higher than the TG levels of patients in the sleeve gastrectomy group. Nevertheless, preoperative data indicated that both groups had low HDL, hypertriglyceridemia, and elevated LDL levels that are so common in obese people.

As far as age and gender were concerned, the current investigations found no substantial variances among the two groups (P values = 0.667, 0.747, and 0.613).

There was high statistical significance between the groups that were analyzed statistically as regards weight in kg, BMI with mean 142.8 ± 11.27 and 50.7 ± 1.8, respectively, before LMGB and 109.03 ± 8.84 and 38.7 ± 1.8, respectively, 6 months after LMGB operation **(*P* value < 0.001*)*.**

These findings support earlier research; Carbajo et al. and Piazza et al.[11,12] reported 80% EWL at 18 months and 2 years, respectively, while Kular et al.[13] reported 91% and 85% at 2 and 5, respectively, and Musella et al.[14] also achieved 77% EWL 5 years after surgery, which is comparable to our study results in terms of EWL.

The average reduction in BMI was 3.36 kg/m2 after 30 days, 8.75 kg/m2 after 6 months, and 11.87 kg/m2 after a year, according to a research by Hutter et al. 15], who reported 944 patients who got SLG.

These results coincide with an earlier study by Hutter et al.,[15] who discovered that after a year, the EWL was much greater in MGB: 66.2% (13.9%) versus 57.3% (19.0%) in SLG, as was BMI, which was 34.9 kg/m2 (4.8 kg/m2) in MGB versus 38.5 kg/m2 (8.6 kg/m2) in SLG (P = 0.001(. Plamper et al.[16] reported that for super-obese individuals, MGB produced greater weight loss at 1 year in comparison to SLG.

There was no statistically significant difference in total cholesterol or HDL levels between the two groups at 6 months post-op; however, there was a statistically significant difference in LDL and TG levels, according to the current study's lipid profiles. It demonstrates that the triglyceride level of cases in the MGB group was significantly higher than the triglyceride level of patients in the sleeve gastrectomy group, while the LDL level of patients in the sleeve gastrectomy group was statistically higher than the LDL level of cases in the MGB group. This finding corresponds to prior research by Pihlajamaki et al.[17]

The current study compared the two groups in terms of the quantity of variation in total cholesterol. It demonstrates that there was a significant difference among the two groups before and after surgery. No statistical difference among two groups in terms of mean total cholesterol (P value > 0.05), and no statistical variance among the two groups in terms of the degree of variation in total cholesterol (*P* value > 0.05). According to the present study, Benaiges et al.[18] found that the effect of both approaches on cholesterol levels was visible as early as the third month.

In the current study, the degree of variation in HDL was compared among the two groups. It demonstrates that there was statistical variation before and after surgery in HDL in both groups, no statistical variation among the two groups in mean HDL, and a statistical variance among the two groups in the amount of change in HDL. According to the present research Bettini et al.,[19] HDL levels increased higher after MGB than after LSG, even though the difference was not statistically significant.

In the current study, the degree of variation in LDL was compared among the two groups. It demonstrates that there was statistical difference between preoperative and postoperative LDL in both groups, a statistical noteworthy difference among the two groups in terms of mean LDL, and a statistical difference among two groups in terms of the amount of change in LDL. Benaiges et al. provided support for the current research by finding that changes in lipid profile 1 year after surgery varied among the two research groups. Total and LDL cholesterol concentrations decreased considerably after LRYGB; however, no statistical changes were found in the LSG group.

The current research compares the amount of change in TG between the two groups. It demonstrates that there was statistical difference among two groups in preoperative and postoperative TG, no statistical difference among two groups in terms of mean TG, and there was statistical difference among two groups in terms of the amount of change in TG. Benaiges et al.[18] revealed that changes in lipid profile a year after surgery varied among the two research groups, which is consistent with the current investigation. Triglyceride levels reduced equally after LRYGB with both surgical techniques.

3.1. Conclusion

Our results demonstrated that bariatric surgery enhances weight reduction and aids in the management or treatment of comorbid conditions by lowering triglyceride levels and raising HDL levels, hence enhancing the cardiac and hepatic patients in the long run.

Our findings suggest that LSG and MGB, two laparoscopic procedures, are equally effective in causing substantial weight reduction and reducing obesity-related medical complications such dyslipidemia. It has been shown that both MGB and LSG reduce LDL, cholesterol, and triglycerides, the greater rise in HDL following MGB is what makes it the recommended operation for individuals with dyslipidemia.

Perhaps this is because, in contrast to other restrictive procedures, MGB surgery results in a longer gastric tube, allowing food to travel through the intestines more quickly after being eaten but before being digested. Lipid absorption and emulsification in the ileum are both diminished as a result of this change. Cholesterol absorption could be lowered, which might have positive effects on health. Appetite loss, satiety before actual fullness and alterations in gastrointestinal hormones all have a role in the decreased food intake that follows MGB, which in turn plays a role in decreased plasma lipids.

In light of this, it has been proposed that processes other than restriction and malabsorption are more essential in determining the effectiveness of weight loss surgery lowering obesity-related comorbidities.

Conflicts of interest

Typically a more formal and documented process that most organizations have adopted in policy to address conflicts of interest.

References

1. World Health Organization. *The state of food security and nutrition in the world 2019: safeguarding against economic slowdowns and downturns*2019. Geneva, Switzerland: Food & Agriculture Org; 2019; 2019.
2. Krentz AJ, Fujioka K, Hompesch M. Evolution of pharmacological obesity treatments: focus on adverse side-effect profiles. *Diabetes Obes Metabol*. 2016;18:558–570, 2016.
3. Tonstad S, Després JP. Treatment of lipid disorders in obesity. *Expert Rev Cardiovasc Ther*. 2011;9:1069–1080.
4. Assunçao ML, Ferreira HS, dos Santos AF, Cabral CR, Florêncio TM. Effects of dietary coconut oil on the biochemical and anthropometric profiles of women presenting abdominal obesity. *Lipids*. 2009;44:593–601.
5. Nelson RH. Hyperlipidemia as a risk factor for cardiovascular disease. *Prim Care Clin Off Pract*. 2013;40:195–211.
6. Einarson TR, Acs A, Ludwig C, Panton UH. Prevalence of cardiovascular disease in type 2 diabetes: a systematic literature review of scientific evidence from across the world in 2007–2017. *Cardiovasc Diabetol*. 2018;17(1):1–19.
7. Smith JrSC. Multiple risk factors for cardiovascular disease and diabetes mellitus. *Am J Med*. 2007;120:S3–S11.
8. Wadden TA, Brownell KD, Foster GD. Obesity: responding to the global epidemic. *J Consult Clin Psychol*. 2002;70:510.
9. Nguyen NT, Varela E, Sabio A, Tran CL, Stamos M, Wilson SE. Resolution of hyperlipidemia after laparoscopic Roux-en-Y gastric bypass. *J Am Coll Surg*. 2006;203(1):24–29.
10. Adams TD, Pendleton RC, Strong MB, et al. Health outcomes of gastric bypass patients compared to nonsurgical, nonintervened severely obese. *Obesity*. 2010;18(1):121–130.

11. Carbajo M, García-Caballero M, Toledano M, Osorio D, García-Lanza C, Carmona JA. One-anastomosis gastric bypass by laparoscopy: results of the first 209 patients. *Obes Surg*. 2005;15(3):398–404.
12. Piazza L, Ferrara F, Leanza S. Laparoscopic mini-gastric bypass: short-term single institute experience. *Update Surg*. 2011;63:239–242.
13. Kular KS, Manchanda N, Rutledge R. Analysis of the five-year outcomes of sleeve gastrectomy and mini gastric bypass: a report from the Indian sub-contient. *Obes Surg*. 2014;24: 1724–1728.
14. Musella M, Susa A, Greco F. The laparoscopic mini-gastric bypass: the Italian experience: outcomes from 974 consecutive cases in a multicenter review. *Surg Endosc*. 2014;28:156–163.
15. Hutter MM, Schirmer BD, Jones DB. First report from the American college of surgeons – bariatric surgery center network: laparoscopic sleeve gastrectomy has morbidity and effectiveness positioned between the band and the bypass. *Ann Surg*. 2011;254:410–422.
16. Plamper A, Lingohr P, Nadal J, Rheinwalt KP. Comparison of mini-gastric bypass with sleeve gastrectomy in a mainly super-obese patient group: first results. *Surg Endosc*. 2017;31: 1156–1162.
17. Pihlajamäki J, Grönlund S, Simonen M, et al. Cholesterol absorption decreases after Roux-en-Y gastric bypass but not after gastric banding. *Metabolism*. 2010;59(6):866–872.
18. Benaiges D, Flores-Le-Roux JA, Pedro-Botet J, et al. Impact of restrictive (sleeve gastrectomy) vs hybrid bariatric surgery (Roux-en-Y gastric bypass) on lipid profile. *Obes Surg*. 2012;22: 1268–1275.
19. Bettini S, Segato G, Prevedello L, et al. Improvement of lipid profile after one-anastomosis gastric bypass compared to sleeve gastrectomy. *Nutrients*. 2021;13(8):2770.