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Research Article

Effect of laparoscopic sleeve gastrectomy on lipid profile of obese patients in complete nine month follow up

Sanjay Singhal, Dhiraj Agarwal*, Rajkamal Kanojiya, Devansh Arora, Ankur Avesthi, Ankur Kothari

Department of General Surgery, Mahatma Gandhi Medical College and Hospital, Sitapura, Jaipur, Rajasthan 302022, India

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***Correspondence:**
Dr. Dhiraj Agarwal,
E-mail: drdhiraj01@gmail.com

ABSTRACT

Background: Obesity is very serious issue in world now days as it has become the global epidemic and major problem in the 21st century which influences many aspects of health. Bariatric surgery has proven to be an effective treatment against obesity and its related co morbidities. Laparoscopic sleeve gastrectomy (LSG) has shown resolution of dyslipidemia in more than 85% of patients in one year. The aim of the study was to monitor the changes of lipid profile in selected parameters for nine months postoperatively.
Methods: The material consist of 50 patient hospitalized in our department of Minimal Invasive Surgery from 2014 to 2015 who underwent LSG in order to treat morbid obesity. Remission of dyslipidemia was defined as return to normal value after Laparoscopic sleeve gastrectomy (LSG) without medication use.
Results: Our study shows that LSG resolved or improved lipid profile in a majority of patients. The main obesity related metabolic risk factors of CVS involve low serum HDL cholesterol level with increased level of TG and LDL level. During initial first 6 month of after surgery significant change in lipid profile reported specially an increase of HDL cholesterol, decrease in TG level and LDL cholesterol.
Conclusions: Nine month after operation improve metabolism and lipid profile was accompanied by decrease in Total Cholesterol, Triglyceride and LDL cholesterol and increase in HDL cholesterol change in significant way.

Keywords: Obesity, Bariatric surgery, Laparoscopic sleeve gastrectomy, Dyslipidemia

INTRODUCTION

Obesity is very serious issue in world now days as it has become the global epidemic and major problem in the 21st century which influences many aspects of health.[1] Obesity has reached epidemic proportion in India in the 21st century, with morbid obesity affecting 5% of the country's population.[2] Due to easy availability of high calorie food following India's continuous integration in global food market, obesity became the major risk factor for cardiovascular disease and NGO such as Indian heart association have been raising awareness about these issues.[3] Dyslipidemia is common feature in obese patient and major risk factor for development of atherosclerosis and then heart related diseases.[4] Bariatric surgery has proven to be an effective treatment against obesity related comorbidities achieving high rate of remission in disease such as type 2 DM[5,6] or arterial hypertension[7,8] among others. In these cases of dyslipidemia studies have shown acceptable short term outcome after bariatric surgery reaching more than 85% of resolution in one year.[9,10] Laparoscopic sleeve gastrectomy (LSG) was introduced initially as a first stage of the biliopancreatic diversion with duodenal switch (BPDDS) for severely obese

patients.[11] Due to its greater efficiency and low complication rate LSG has become more widely accepted as a definitive treatment for morbidly obese patients.[12] In LSG stomach is divided vertically, while removing most of the fundus of the stomach and preserving the continuity of digestive tract.[13] Eighty percentages of patient with obesity present with lipid abnormality and 15-20% patient do not show classic metabolic lipid changes.[14] Hyperlipidemia is widely recognized as major co-morbidity in severe obese patients. So now a day's bariatric surgeries are increasingly focused on lipid profile in the drive to potentially reduce cardiovascular related disease.[15,16] The aim of the study is monitor the changes of lipid profile in selected parameters to 9 month postoperatively.

METHODS

The material consist of 50 patient hospitalized in our department of Minimal Invasive Surgery from 2014 to 2015 who underwent LSG in order to treat morbid obesity. The accepted criteria for surgery treatment took in account the guidelines issued by the International Federation for the Surgery of Obesity and Metabolic Disorder (IFSO) i.e. individuals with BMI> 40 kg/m2 or BMI > 35kg/m^2 with co morbidities.[17] The exclusion criteria include thyroid gland disease of digestive system, disorder of renal function, DM and previously on hypolipidemic treatment. All patients planned for surgery were consulted preoperatively by endocrinologist. Psychologist, dietician and women by gynecologists. Biochemical test were performed that were glucose level (F&PP), Glucose tolerance test, glycosylated Hb, insulin, triglyceride (TG), total cholesterol (TC) and HDL & LDL cholesterol. Medical imaging was also performed that were chest x-ray, USG whole abdomen, 2D echo, color Doppler of lower limb vein in routine to all patients to exclude any other pathology.

Dyslipidemia was defined according to NCEP ATP-III guidelines:[18]

Total cholesterol > 200 mg/dl
TG >150 mg/dl
LDL cholesterol > 130 mg/dl
HDL cholesterol <40 mg/dl

Remission of dyslipidemia was defined as return to normal value without medication use, so patient taking oral anti-lipemic medicine previously excluded from study.

Surgical Technique

LSG begun with standard port placement with precise examination of stomach and localization of crow's foot, using a harmonic knife. Gastrocolic omentum was cut next to wall of stomach and in middle of Gastrocolic omentum vessels. Cut off line of omentum reached upward to the left diaphragmatic branch and downward approximately 6 cm from pylorus. First stapler separates the greater curvature towards the crow's foot and following stapler separates the curvature along the body of stomach to the Angle of His. Now stomach reduce to narrow tube of 35 F. Tightness of suture line was checked by methylene blue test. Finally the drain near the cut off line was placed. The resected stomach was extracted following some dilatation of camera port or epigastric port. The surgery last average of 90 minutes. Patients were discharged home in 3rd to 4th post operative day and were under counsel of dietician and OPD. All patients were examined 1, 3, 6 and 9 months after the surgery. Fasting blood sample were taken and all blood results were analyzed.

RESULTS

According to the analysis of obtained material, it is possible to count that:

The average age of patients included in our study was 47.98±12.16 yrs (27-68 years).

The average weight of patients was 117.90±18.00 kg (95-160 kg). The average BMI was 46.41±4.21 kg/m^2 (35-52.1 kg/m^2).

These basic anthropometric data are shown in Table 1.

The average body weight after 3 month, 6 month and 9 month of surgery 99.10 kg, 94.6 kg and 94.5 kg respectively.

The average BMI after 3 month, 6 month and 9 month of surgery was 39.14 kg/m^2, 35.05 kg/m^2, 35.55 kg/m^2 respectively.

The changes are seen in Table 1.

Table 1: Demographic criteria of obese patient (preoperative and postoperative).

Parameters	Pre surgery	3 months after surgery ±SD	6 months after surgery ±SD	9 months after surgery ±SD
Age [years]	47.98± 12.16	-	-	-
Weight [kg]	117.90± 18.00	99.10± 16.12	94.6± 12.34	94.5± 11.55
BMI [KG/M^2]	46.41± 4.21	39.14± 5.98	35.05±5.34	35.55±4.77

After the analysis of anthropometric parameter in 50 patients of LSG all components of lipid profile was observed at 3 months, 6 months and 9 months of surgery.

For Total Cholesterol level

We observed a statistically significant decrease of its value only just 3 months after surgery. In the first month reduction of cholesterol was insignificant. However between 3rd to 6thmonth the decrease has stopped and remained on the same level up to 9 month. Further decrease has been observed since the nine month after the surgery (Table 2).

Table 2: Total cholesterol level in obese patients (preoperative and postoperative).

	Before surgery	1 month	3 months	6 months	9 month
Total cholesterol	218.05± 17.61	212± 30.1 NS	184.4±11.4 Significant	184.2± 9.6 NS	183± 8.9 NS

For Triglyceride (TG) level and LDL cholesterol

During the examination of TG concentration, we stated a statistically significant decrease of its value after 1 month after 3 months and after 6 months in comparison to preoperative value.

Values for TG and LDL almost remain same after 6 months to 9 months follow up (Table 3).

Table 3: LDL level in obese patients (preoperative and postoperative).

	Before surgery	1 month	3 months	6 months	9 month
TG	172.3± 48.8	125.7± 24.6	110.6± 38.2	90.65± 25.10	89± 24.9
LDL cholesterol	148.42± 30.5	125.1± 20.2	110.1± 21.3	101.1± 8.2	100± 6.9

For HDL cholesterol

Significant increase was observed in 9 month after the surgery in comparison to preoperative value (Table 4).

Table 4: HDL Level in obese patients (preoperative and postoperative).

	Before surgery	1 month	3 months	6 months	9 months
HDL	40.84± 10.15	42.5± 8.5	44.3± 8.4	44.3± 8.9	45± 8.8

DISCUSSION

Dyslipidemia are a major risk factor for cardiovascular disease, the main cause of mortality worldwide. Obesity is frequently associated with dyslipidemia[4] and bariatric surgery is most effective treatment for obesity[19] with high rate of prevention[20] and remission of comorbid condition after surgery including dyslipidemia.[5,7,19,21]

Nine month after surgery (LSG), there were significant average weight reduction in the study group. DeAquino LA et al defines bariatric procedure has successful if patients demonstrate weight loss below 25% of their preoperative weight, satisfactory if they loss 25-30% of their preoperative level and very good weight loss over 30% of its preoperative value.[22] Consequently our results can be evaluated as successful and comparable to similar studies after LSG Buchwold et al metaanalysis.[23]

The main purpose of this study was to investigate further the effect of LSG on hyperlipidemia. Our study shows that LSG resolved or improved lipid profile in a majority of patients.The main obesity related metabolic risk factors of CVS involve low serum HDL cholesterol level with increased level of TG and LDL level. During 6 month of after surgery significant change in lipid profile reported specially an increase of HDL cholesterol, decrease in TG level and LDL cholesterol.

Similar results were obtained by team of Strain GW et al[24] as in our study.

Feng Z et al[25] also indicated that low level of HDL cholesterol and high TG are the main risk factor for cardiovascular disease in obese patient.

Regarding the cardiovascular risk the observed increased HDL and decrease TG level are fairly positive prognostic factor.[26,27]

Similar results were obtained by Vidal et al with a significant improvement of lipid profile following LSG.[28]

In our study 9 month after LSG we observed not only decreased total cholesterol, decrease TG and LDL cholesterol but also increase in HDL cholesterol.[17,24,29]

CONCLUSION

In conclusion our study shows that LSG is very good bariatric procedure with excellent results on short term follow up regarding body weight reduction, BMI. Nine month after operation improve metabolism and lipid profile was accompanied by decrease in Total Cholesterol, Triglyceride and LDL cholesterol and increase in HDL cholesterol change in significant way.

The short term follow up period after the operation and the relatively low no. of patients included in the study

were potential limitations of our study. However, results are comparable to other recently published studies.

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