

## ORIGINAL RESEARCH

### Pre and Post-operative comparative analysis of Serum Lipid profile in patients with Cholelithiasis

<sup>1</sup>Dr. Subhranshu Shekhar, <sup>2</sup>Dr. Piyush Agarwal

<sup>1</sup>Associate Professor, Department of Pathology, Narayan Medical College, Sasaram, Bihar, India

<sup>2</sup>Associate Professor, Department of General Surgery, Narayan Medical College, Sasaram, Bihar, India

#### Corresponding author

Dr. Piyush Agarwal

Associate Professor, Department of General Surgery, Narayan Medical College, Sasaram, Bihar, India

Received: 11 November, 2022

Accepted: 14 December, 2022

#### ABSTRACT

**Background:** To compare and analyse the pre and post-operative serum lipid profile in patients with cholelithiasis.

**Materials & methods:** A total of 30 subjects were enrolled. The age group of 25–60 years were included. Gallstones were collected after cholecystectomy and further divided into categories depending on their shape, size, and texture. Laboratory investigations were done. The results were analysed using SPSS software. Comparison between subjects were done using student's unpaired t-test and  $P < 0.05$  was regarded as statistically significant.

**Results:** A total of 30 subjects were enrolled. The decrease in mean levels of serum cholesterol was significant after 1 week of surgery. There was a significant increase in serum TGs after 1 week of surgery.

**Conclusion:** Cholecystectomy can significantly improve lipid levels in patients with gallstones.

**Keywords:** lipid, cholelithiasis, preoperative.

#### INTRODUCTION

Gallstone disease is one of the most prevalent gastrointestinal diseases with worldwide distribution and with a substantial burden to health-care delivery system.<sup>1,2</sup> Gallstone disease is a chronic recurrent hepatobiliary disease, which may result from impaired metabolism of cholesterol, bilirubin and bile acid (BA), and is characterized by the formation of the gallstone in hepatic bile duct, common bile duct or gallbladder.<sup>3</sup> Many studies have shown an association between gallstones and abnormal lipids.

Most of the gallstones patients present with severe abdominal pain requiring investigations and treatment. Many of them need surgical intervention by the time they are symptomatic.<sup>4</sup> If the gallbladder is removed, the bile in the liver will directly enter the upper part of the intestine. As a result, BA circulate faster, thus exposing the enterohepatic system to a greater BA flux. Lipid and BA metabolisms are functionally interrelated.<sup>5</sup> Though lipid and bile acids metabolisms are functionally correlated, how cholecystectomy affects lipid profile is not well-comprehended. High lipid profile readings, consisting of elevations in chylomicron, low-density lipoprotein (LDL), very-low-density lipoprotein (VLDL), and intermediate-

density lipoprotein (IDL) levels, are becoming increasingly prevalent, especially with the spreading factors among the Saudi population, such as urban residence, increasing age, especially 40 years; physical inactivity, overweight and obesity, diabetes mellitus, frequent fast food consumption, and so on.<sup>6</sup> Hence, this study was conducted to compare and analyse the pre and post-operative serum lipid profile in patients with cholelithiasis.

## MATERIALS & METHODS

A total of 30 subjects were enrolled. The age group of 25–60 years were included. Gallstones were collected after cholecystectomy and further divided into three categories depending on their shape, size, and texture. A detailed history to assess the various risk factors was taken, with particular attention to the hepatobiliary system. Each patient was examined physically to assess the general condition, and the vital data were recorded. Laboratory investigations were done. The results were analysed using SPSS software. Comparison between subjects were done using student's unpaired t-test and  $P < 0.05$  was regarded as statistically significant.

## RESULTS

A total of 30 subjects were enrolled. The decrease in mean levels of serum cholesterol was significant after 1 week of surgery. There was a significant increase in serum TGs after 1 week of surgery.

**Table 1: Serum lipid profile in preoperative and 1 week postoperative**

Parameters	Pre-operative	1 week, post-operative	P - value
TC (mg %)	165.63	148.12	<0.001
TGs (mg %)	202.52	223.98	<0.001
HDL-C (mg %)	46.20	37.02	<0.01
LDL-C (mg %)	112.08	106.45	0.02
VLDL (mg %)	52.32	51.74	0.4

TC: total cholesterol, HDL-C: high density lipoprotein cholesterol, LDL-C: low-density lipoprotein cholesterol, TGs: triglycerides, VLDL: very low-density lipoprotein.

The serum HDL-C slightly decrease after 1 week of surgery, but it significantly increased after 1 month of surgery, however, no significant difference was observed in LDL-C and VLDL-C after 1 week and 1 month of surgery.

**Table 2: postoperative after 1 month lipid profile**

Parameters	1 month, post-operative
TC (mg %)	120.65
TGs (mg %)	185.69
HDL-C (mg %)	51.56
LDL-C (mg %)	110.47
VLDL (mg %)	44.01

## DISCUSSION

Gallstones are known to be involved with hyperlipidemia.<sup>7-9</sup> The removal of the gallbladder is thereby, known to affect the production of bile acids and lipid metabolism.<sup>10</sup> Absorption of cholesterol is chiefly facilitated by the action of bile salts and phospholipids. Excess of cholesterol or insufficiency of bile salts or phospholipids can lead to the nucleation of cholesterol crystals, which can cause gall stones.<sup>11</sup> To it, secretion of cholesterol-rich bile acids, levels of bile acids and phospholipids that mediate cholesterol accumulation and reabsorption of deoxycholic in large intestine are some of the known causes of gallstones.<sup>12</sup> Dyslipidemia is also reported to be a risk factor of gall stones and is presented in more than

50% of the patients with gallstones.<sup>13-15</sup> Hence, this study was conducted to compare and analyse the pre and post-operative serum lipid profile in patients with cholelithiasis.

In the present study, a total of 30 subjects were enrolled. The decrease in mean levels of serum cholesterol was significant after 1 week of surgery. There was a significant increase in serum TGs after 1 week of surgery. A study by Gill GS et al, studied the effect of cholecystectomy on lipid levels in patients with gallstones. The study was conducted on 50 patients with gallstones and 30 healthy volunteers for comparison of lipid levels. Subsequently, cholecystectomy was conducted on patients with gallstones and pre- and post-operative lipid levels were compared. There was a significant decrease in total cholesterol, and triglycerides levels and increase in high-density lipoprotein levels after 1 month of surgery, while low-density lipoprotein levels and very low-density lipoprotein were not statistically changed.<sup>14</sup>

In the present study, the serum HDL-C slightly decrease after 1 week of surgery, but it significantly increased after 1 month of surgery, however, no significant difference was observed in LDL-C and VLDL-C after 1 week and 1 month of surgery. Another study by Pooria A et al, studied preoperative cholesterol levels and those following a month of the surgery were measured in the patients. 33 patients were included in the study, of which 29 were females and 4 were males. 48.5% of our patient's population were aged above 50 years. The mean of preoperative cholesterol levels was 203.78 mg/dL. One month after the surgery, the mean cholesterol level was found to be 197.03 mg/dL. Overall, there was no statistical difference between the preoperative and one-month postoperative cholesterol level.<sup>16</sup> Kanakala, Borowski reported that the number of females who underwent cholecystectomy was 2.8 times more than men.<sup>17</sup> Moreover, a meta-analysis has shown that increased BMI, female sex, increased age, and increased cholesterol levels are associated with an increased risk of gallstones.<sup>18</sup> Gill and Gupta in their study showed that of 60 patients who underwent cholecystectomy for gallstones, 52 of them were female, and great percentage of their patients were aged from 40 to 60 years.<sup>14</sup> To the date, female gender is a proven risk factor of gallstones from the number of studies. Increased alcohol consumption and cessation of hormone therapy are negatively related to the development of gallstones in females.<sup>19</sup>

## CONCLUSION

Cholecystectomy can significantly improve lipid levels in patients with gallstones.

## REFERENCES

1. Sandler RS, Everhart JE, Donowitz M, Adams E, Cronin K, Goodman C, et al. The burden of selected digestive diseases in the United States. *Gastroenterology*. 2002;122:1500–11.
2. Aerts R, Penninckx F. The burden of gallstone disease in Europe. *Aliment Pharmacol Ther*. 2003;18(Suppl 3):49–53.
3. Belousov Yu V. Up-to-date guide. Moscow: Exma; 2006. *Pediatric gastroenterology*; p. 112.
4. Jaraari AM, Jagannadharao P, Patil TN, Hai A, Awamy HA, El Saeity SO, et al. Quantitative analysis of gallstones in Libyan patients. [Last cited on 2017 Jun 06]; *Libyan J Med*. 2010 5
5. Amigo L, Husche C, Zanlungo S, Lütjohann D, Arrese M, Miquel JF, et al. Cholecystectomy increases hepatic triglyceride content and very-low-density lipoproteins production in mice. *Liver Int*. 2011;31:52–64.
6. Effect of cholecystectomy on lipid profile in Bangladeshi patients with cholelithiasis. MujibulHaq AM, Giasuddin ASM, Jhuma KA, Choudhury MAM. *J Metab Syndr*. 2015;5:192.

7. Jindal N., Singh G., Ali I., Sali G., Reddy R. Effect of cholelithiasis and cholecystectomy on serum lipids and blood glucose parameters. *Arch. Int. Surgery.* 2013;3(2):97–101.
8. Ahmadinejad M., Pak H., Soltanian A., Poryyaghobi S.M., Mohammadzadeh S., Ahmadi A., et al. A retrospective study on the cardiac assessment of isolated sternal fracture patients based on radiographic and clinical outcomes. *Ann. Med. Surg.* 2021;69
9. Azadbakht M., Emadi-jamali S.M., Azadbakht S. Hypocalcemia following total and subtotal thyroidectomy and associated factors. *Ann. Med. Surg.* 2021;66
10. Moazenibistgani M., Kheiri S., Ghorbanpour K. The effects of cholecystectomy on serum lipids during one year follow-up. *Research.* 2014;1
11. Portincasa P., Moschetta A., Palasciano G. Cholesterol gallstone disease. *Lancet.* 2006;368(9531):230–239.
12. Beckingham I. Gallstone disease. *Br. Med. J.* 2001;322(7278):91–94.
13. Azadbakht M., Azadbakht S., Pooria A., Chitgarchari H. Evaluation of one-year incidence of vocal dysfunction and associated demographic factors in thyroidectomy patients: a descriptive analytical study. *Ann. Med. Surg.* 2021;62:469–472.
14. Gill G.S., Gupta K. Pre- and post-operative comparative analysis of serum lipid profile in patients with cholelithiasis. *Int. J. Appl. Basic Med. Res.* 2017;7(3):186–188.
15. Singh K., Dahiya D., Kaman L., Das A. Prevalence of non-alcoholic fatty liver disease and hypercholesterolemia in patients with gallstone disease undergoing laparoscopic cholecystectomy. *Pol. J. Surg.* 2020;92:18–22.
16. Pooria A, Poryya A, Gheini A. Comparison of preoperative and one-month postoperative serum cholesterol after cholecystectomy. *Ann Med Surg (Lond).* 2022 Jun 22;79:104016.
17. Kanakala V., Borowski D.W., Pellen M.G.C., Dronamraju S.S., Woodcock S.A.A., Seymour K., et al. Risk factors in laparoscopic cholecystectomy: a multivariate analysis. *Int. J. Surg.* 2011;9(4):318–323.
18. Shabanzadeh D.M., Sorensen L.T., Jorgensen T. Determinants for gallstone formation - a new data cohort study and a systematic review with meta-analysis. *Scand. J. Gastroenterol.* 2016;51(10):1239–1248.
19. Shabanzadeh D.M., Holmboe S.A., Sorensen L.T., Linneberg A., Andersson A.M., Jorgensen T. Are incident gallstones associated to sex-dependent changes with age? A cohort study. *Andrology.* 2017;5(5):931–938.