

Analysis of Alterations in Serum Profile of Gallstone Patients Undergoing Cholecystectomy at a Tertiary Care Hospital

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ABSTRACT

Background: Laparoscopic cholecystectomy (LC) is a minimally invasive surgical procedure for removal of a diseased gallbladder. The known factors associated with cholesterol gallstones include cholesterol hypersecretion and supersaturation, bile salt and phospholipid concentrations, crystal nucleation, gallbladder dysmotility and gallbladder absorption and secretion functions. Even though lipid and bile acid metabolisms are functionally related, how gallbladder removal affects lipids is not well understood. This study investigated the effects of serum cholesterol, LDL, and HDL levels on the cholesterol concentration of gallstones in patients with cholelithiasis.

Materials & Methods: We commenced the present investigation included assessment of serum lipid profile of the gallstone patients undergoing LC. After meeting the inclusion criteria, a total of 30 gallstone patients were included in the present study, which were scheduled to undergo LC. Blood samples were obtained in all the patients prior to the surgery for estimation of serum lipid profile. LC was done in all the patients under the hands of skilled surgeons. Postoperative samples were obtained in all the patients. All the samples were sent to the pathology laboratory for the estimation of serum lipid profile.

Results: Mean TC levels preoperatively, one week postoperatively and one month postoperatively were 166.5, 147.1 and 121.6 mg% respectively. Mean HDL levels

preoperatively, one week postoperatively and one month postoperatively were 45.3, 39.6 and 50.3 mg% respectively. Mean TG levels preoperatively, one week postoperatively and one month postoperatively were 199.1, 220.3 and 174.3 mg% respectively. Significant results were obtained while comparing the mean alterations in the serum TC, HDL and TG levels at various time intervals.

Conclusion: Significant alterations of the serum lipid profile of the patients undergoing LC do occur at preoperative and various postoperative time intervals.

Key words: Cholecystectomy, Cholesterol, Lipid.


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Article History:

Received: 09-09-2018, Revised: 02-10-2018, Accepted: 28-10-2018

Access this article online

Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2018.4.6.079	

INTRODUCTION

Laparoscopic cholecystectomy (LC) is a minimally invasive surgical procedure for removal of a diseased gallbladder. The etiology of gallbladder disease is associated with a poorly functioning gallbladder and superconcentrated bile. A classic finding for gallbladder disease is right upper quadrant or epigastric abdominal pain.^{1,2} The known factors associated with cholesterol gallstones include cholesterol hypersecretion and supersaturation, bile salt and phospholipid concentrations, crystal nucleation, gallbladder dysmotility and gallbladder absorption and secretion functions. Low-density lipoproteins (LDLs) and high-

density lipoproteins (HDLs) are plasma lipids, and their main function is to transport cholesterol. LDL transports cholesterol from the liver to the peripheral tissues, and HDL transports cholesterol from the peripheral tissues to the liver.³⁻⁵

According to McGregor et al., the reduction in the total size of the incision seen in single-port laparoscopic cholecystectomy (LC) will result in a decrease in the systemic stress response, with a potential reduction in postoperative morbidity.⁶ Even though lipid and bile acid metabolisms are functionally related, how gallbladder removal affects lipids is not well understood.⁷

This study investigated the effects of serum cholesterol, LDL (low density lipoprotein), and HDL (High density lipoprotein) levels on the cholesterol concentration of gallstones in patients with cholelithiasis.

MATERIALS & METHODS

We commenced the present investigation in the Department of General Surgery, Saraswathi Institute of Medical Sciences, Hapur Road, Anwarpur, Uttar Pradesh (India) and it included assessment of serum lipid profile of the gallstone patients undergoing LC. Written consent was obtained from all the patients after explaining in detail the entire research protocol.

Inclusion Criteria

- Patients between the age group of 25 to 55 years,
 - Patients with absence of any underlying lipid metabolic disorder,
 - Patients with absence of any underlying co-morbid condition
- After meeting the inclusion criteria, a total of 30 gallstone patients were included in the present study, which were scheduled to undergo LC. Blood samples were obtained in all the patients prior to the surgery for estimation of serum lipid profile. LC was done in

all the patients under the hands of skilled surgeons. Postoperative samples were obtained in all the patients. All the samples were sent to the pathology laboratory for the estimation of serum lipid profile. Results were compiled and were assessed by SPSS software. Chi- square test was used for evaluation of level of significance.

RESULTS

Analysis of a total of 30 gallstone patients was done in the present study with mean age of 43.1 years. Majority of the patients belonged to the age group of 41 to 50 years. Among these 30 subjects, 12 were males while the remaining 18 were females. Mean TC levels preoperatively, one week postoperatively and one month postoperatively were 166.5, 147.1 and 121.6 mg% respectively. Mean HDL levels preoperatively, one week postoperatively and one month postoperatively were 45.3, 39.6 and 50.3 mg% respectively. Mean TG levels preoperatively, one week postoperatively and one month postoperatively were 199.1, 220.3 and 174.3 mg% respectively. Significant results were obtained while comparing the mean alterations in the serum TC, HDL and TG levels at various time intervals (P- value < 0.05).

Graph 1: Demographic data

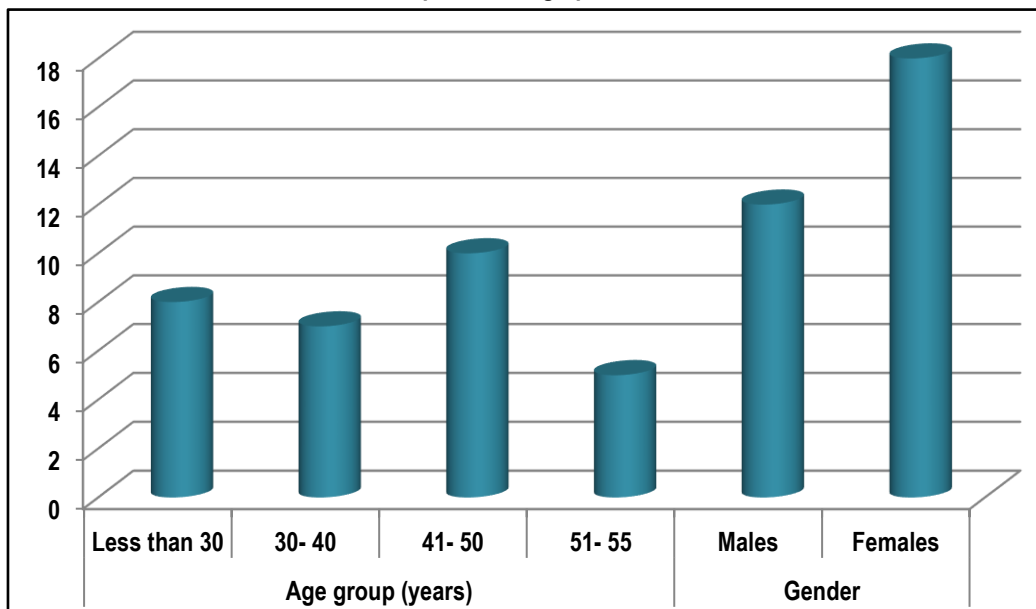


Table 1: Comparison of preoperative and postoperative serum lipid profile

Serum lipid profile	Preoperative	Postoperative	Postoperative	P- value
		1 week	1 month	
Total cholesterol (TC) (mg %)	166.5	147.1	121.6	0.02*
HDL (High density lipoprotein) (mg %)	45.3	39.6	50.3	0.01*
LDL (Low density lipoprotein) (mg %)	109.3	100.2	104.3	0.82
Triglycerides (TG) (mg %)	199.1	220.3	174.3	0.03*

DISCUSSION

In the present study, majority of the patients belonged to the age group of 41 to 50 years. Among these 30 subjects, 12 were males while the remaining 18 were females. Mean TC levels preoperatively, one week postoperatively and one month postoperatively were 166.5, 147.1 and 121.6 mg% respectively. Mean HDL levels preoperatively, one week postoperatively and

one month postoperatively were 45.3, 39.6 and 50.3 mg% respectively. 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. Cholecystectomy can significantly improve lipid levels in patients with gallstones.⁸ Atamanalp SS et al investigated the effects of serum cholesterol, LDL, and HDL levels on gallstone cholesterol concentration. The gallstones of 75 patients with cholelithiasis were examined using spectrophotometry. High serum cholesterol and LDL levels were associated with high cholesterol stone rates. Similarly, high serum cholesterol and LDL levels were correlated with high gallbladder stone cholesterol concentrations. In contrast, low serum HDL levels do not seem to affect the occurrence of gallbladder cholesterol stones or gallbladder stone cholesterol concentrations. The relationship between cholesterol, LDL, and HDL levels and cholesterol gallstone formation is multifactorial and complex and is also dependent on other individual properties.⁹

Mean TG levels preoperatively, one week postoperatively and one month postoperatively were 199.1, 220.3 and 174.3 mg% respectively. Significant results were obtained while comparing the mean alterations in the serum TC, HDL and TG levels at various time intervals. Malik AA et al elucidated the association of dyslipidaemia with Cholelithiasis and effect of Cholecystectomy on the same. 73 patients with symptomatic gallstones were studied prospectively. Plasma concentration of cholesterol, triglycerides, LDL, HDL was analysed preoperatively and postoperatively on day 3 and after 6 months of Cholecystectomy. None of the patients received any lipid lowering drug or dietary restriction. 36 (80%) of the female patients and 20 (71.42%) of male patients had one or other abnormality in their lipid profile preoperatively. Plasma concentration of total cholesterol, triglycerides, and LDL cholesterol were significantly reduced in patients on day 3 of surgery and 6 months thereafter. There was no significant increase/decrease in HDL cholesterol in 6 months after Cholecystectomy. There was a significant decrease in plasma concentration of lipids in Cholecystectomy patients postoperatively. These changes in plasma lipids are likely to have significant effect in the development of coronary artery diseases in patients with Cholecystectomy.¹⁰ Juvonen T et al elucidated the effect of cholecystectomy, a common surgical procedure, on the concentrations of plasma lipids and lipoproteins. 19 consecutive patients with symptomatic gallstone disease and emptying gallbladder, and 16 control patients (Nissen-Rosetti fundoplication) were studied. Cholesterol, triglyceride, and protein concentrations of various lipoproteins were analysed. Plasma total and LDL cholesterol levels were significantly reduced in cholecystectomy patients at day 3 after the operation, the values returning to the preoperative level thereafter. In the control patients' similar trends were observed for total and LDL cholesterol levels but these changes did not reach statistical significance. In cholecystectomy patients a significant increase was noticed in the very-low-density lipoprotein and intermediate density lipoprotein apoprotein B concentration three years after surgery. These minor changes in plasma lipoproteins following cholecystectomy were unlikely to have any importance in the development coronary heart disease.¹¹

CONCLUSION

Under the light of above-mentioned data, the authors conclude that significant alterations of the serum lipid profile of the patients undergoing LC do occur at preoperative and various postoperative time intervals. However; further studies are recommended.

REFERENCES

1. Tsutsui N, Yoshida M, Kitajima M, Suzuki Y. Laparoscopic cholecystectomy using the PINPOINT endoscopic fluorescence imaging system with intraoperative fluorescent imaging: A case report. *Int J Surg Case Rep.* 2016; 21:129-32.
2. Kartal K, Uludag M. Can 4-port laparoscopic cholecystectomy remain the gold standard for gallbladder surgery? *Ann Ital Chir.* 2016; 87:13-7.
3. Tropea A, Pagano D, Biondi A, Spada M, Gruttadauria S. Treatment of the iatrogenic lesion of the biliary tree secondary to laparoscopic cholecystectomy: a single center experience. *Updates Surg.* 2016 Jun;68(2):143-8.
4. Keus F, Gooszen HG, Van Laarhoven CJ. Systematic review open, small-incision or laparoscopic cholecystectomy for symptomatic cholelithiasis. *Aliment Pharmacol Ther.* 2009;29(4):359-378.
5. Karalis KP, Giannogonas P, Kodela E, Koutmani Y, Zoumakis M, Teli T. Mechanisms of obesity and related pathology linking immune responses to metabolic stress. *FEBS J.* 2009;276(20):5747-5754.
6. McGregor CG, Sodergren MH, Aslanyan A, Wright VJ, Purkayastha S, Darzi A, Paraskeva P. Evaluating systemic stress response in single port vs multi-port laparoscopic cholecystectomy. *J Gastrointest Surg.* 2011;15(4):614-622.
7. Gill GS, Gupta K. Pre- and Post-operative Comparative Analysis of Serum Lipid Profile in Patients with Cholelithiasis. *International Journal of Applied and Basic Medical Research.* 2017;7(3):186-188.
8. Gill GS, Gupta K. Pre- and Post-operative Comparative Analysis of Serum Lipid Profile in Patients with Cholelithiasis *Int J Appl Basic Med Res.* 2017 Jul-Sep; 7(3): 186-188.
9. Atamanalp SS et al. The effects of serum cholesterol, LDL, and HDL levels on gallstone cholesterol concentration. *Pak J Med Sci.* 2013 Jan-Mar; 29(1): 187-190.
10. Malik AA, Wani ML, Tak SI, Irshad I, Ul-Hassan N. Association of dyslipidaemia with cholelithiasis and effect of cholecystectomy on the same. *Int J Surg.* 2011;9(8):641-2.
11. Juvonen T, Kervinen K, Kairaluoma MI, Kesäniemi YA. Effect of cholecystectomy on plasma lipid and lipoprotein levels. *Hepatogastroenterology.* 1995 Jul-Aug;42(4):377-82.

Source of Support: Nil.

Conflict of Interest: None Declared.

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Cite this article as: Praveen Atre, Pramod Tyagi. Analysis of Alterations in Serum Profile of Gallstone Patients Undergoing Cholecystectomy at a Tertiary Care Hospital. *Int J Med Res Prof.* 2018 Nov; 4(6): 338-40. DOI:10.21276/ijmrp.2018.4.6.079