

Original Research

Evaluation of lipid profile in patients undergoing laparoscopic cholecystectomy

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ABSTRACT:

Background: Gallstone disease is a chronic and recurrent condition affecting the hepatobiliary system. The metabolic processes of lipids and bile acids are interconnected. Despite this functional relationship, the impact of gallbladder removal on lipid metabolism remains inadequately understood. Therefore, this study was undertaken to evaluate the lipid profiles of patients undergoing laparoscopic cholecystectomy. **Materials & methods:** A total of 50 patients presenting with the primary complaint of cholelithiasis and scheduled for laparoscopic cholecystectomy (LC) were included in the study. Each patient received a comprehensive explanation of the surgical procedure prior to the operation. Blood samples were collected from all participants before the initiation of the surgery. Following the completion of the laparoscopic cholecystectomy, additional blood samples were obtained for comparison with the preoperative values. **Results:** A total of 50 patients participated in the study, with an average age of 45.3 years. The majority of the participants were female. In the preoperative phase, the mean levels of total cholesterol (TC), high-density lipoprotein (HDL), and triglycerides (TG) were recorded at 169.4 mg/dL, 49.5 mg/dL, and 193.7 mg/dL, respectively. Postoperatively, the mean levels of TC, HDL, and TG were observed to be 147.6 mg/dL, 41.1 mg/dL, and 210.9 mg/dL, respectively. Statistical analysis revealed a significant change in the mean lipid profile of all patients following the surgical intervention. **Conclusion:** Notable changes in the serum lipid profile are observed in individuals undergoing laparoscopic cholecystectomy.

Key words: Laparoscopic cholecystectomy, Lipid profile

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INTRODUCTION

Gallstone disease is a chronic and recurrent condition affecting the hepatobiliary system. It has emerged as a significant global health concern, with an incidence rate of approximately 1.4 cases per 100 individuals. By the time symptoms manifest, a considerable number of patients require surgical intervention. Evidence indicates that over 50% of individuals with gallstones exhibit some form of lipid disorder. Although lipid metabolism and bile acid metabolism are functionally interconnected, the impact of cholecystectomy on lipid profiles remains inadequately understood.¹ There is a growing prevalence of elevated lipid profiles, characterized by increased levels of chylomicrons, low-density lipoprotein (LDL), very-low-density lipoprotein (VLDL), and intermediate-density lipoprotein (IDL).

This trend is particularly notable among the Saudi population, influenced by factors such as urban living, advancing age—especially beyond 40 years—sedentary lifestyles, overweight and obesity, diabetes mellitus, and frequent consumption of fast food.^{2,3} Gallstone patients typically experience significant abdominal pain, necessitating further investigation and treatment. A considerable number of these individuals require surgical intervention by the time they exhibit symptoms. Following the removal of the gallbladder, bile produced in the liver is directed into the upper segment of the intestine. This alteration leads to an accelerated circulation of bile acids (BA), thereby increasing the flux of BA within the enterohepatic system. The metabolic processes of lipids and bile acids are closely interconnected. Despite this functional relationship, the impact of

gallbladder removal on lipid metabolism remains inadequately understood. Consequently, the current study aims to evaluate the lipid profiles of patients undergoing laparoscopic cholecystectomy (LC).^{4,5}

MATERIALS & METHODS

Gallstone patients typically experience significant abdominal pain, necessitating further investigation and treatment. A considerable number of these individuals require surgical intervention by the time they exhibit symptoms. Following the removal of the gallbladder, bile produced in the liver is directed into the upper segment of the intestine. This alteration leads to an accelerated circulation of bile acids (BA), thereby increasing the flux of BA within the enterohepatic system. The metabolic processes of lipids and bile acids are closely interconnected. Despite this functional relationship, the impact of

gallbladder removal on lipid metabolism remains inadequately understood. Consequently, the current study aims to evaluate the lipid profiles of patients undergoing laparoscopic cholecystectomy (LC).

RESULTS

A total of 50 patients participated in the study, with an average age of 45.3 years. The majority of the participants were female. In the preoperative phase, the mean levels of total cholesterol (TC), high-density lipoprotein (HDL), and triglycerides (TG) were recorded at 169.4 mg/dL, 49.5 mg/dL, and 193.7 mg/dL, respectively. Postoperatively, the mean levels of TC, HDL, and TG were observed to be 147.6 mg/dL, 41.1 mg/dL, and 210.9 mg/dL, respectively. Statistical analysis revealed a significant change in the mean lipid profile of all patients following the surgical intervention.

Table 1: Comparison of lipid profile

Lipid profile	Preoperative	Postoperative	p- value
Mean TC (mg %)	169.4	147.6	0.00*
HDL (mg %)	49.5	41.1	0.19
TG (mg %)	193.7	210.9	0.00*

*: Significant

DISCUSSION

The gallbladder is a small, thin-walled green structure located beneath the liver, specifically within the main liver fissure at the convergence of the right and left lobes. Cholelithiasis refers to the occurrence or development of gallstones within the common bile duct (CBD). Cholecystectomy has traditionally been regarded as a safe surgical procedure; however, the potential secondary effects have often been underestimated, particularly considering the gallbladder's role as a regulator that collaborates with essential pathways to maintain metabolic homeostasis. Patients with gallstones frequently present with intense abdominal pain, necessitating further investigation and treatment.⁶

Many individuals require surgical intervention by the time they exhibit symptoms. Following the removal of the gallbladder, bile produced in the liver flows directly into the upper intestine, leading to an accelerated circulation of bile acids (BA) and consequently increasing the exposure of the entire hepatic system to a heightened flux of bile acids. The metabolism of lipids and bile acids is intricately connected.⁷

Hence; the present study was conducted for assessing the lipid profile in patients undergoing LC.

A total of 50 patients participated in the study, with an average age of 45.3 years. The majority of the participants were female. In the preoperative phase, the mean levels of total cholesterol (TC), high-density lipoprotein (HDL), and triglycerides (TG) were recorded at 169.4 mg/dL, 49.5 mg/dL, and 193.7 mg/dL, respectively. Postoperatively, the mean levels of TC, HDL, and TG were observed to be 147.6

mg/dL, 41.1 mg/dL, and 210.9 mg/dL, respectively. Statistical analysis revealed a significant change in the mean lipid profile of all patients following the surgical intervention.

Osman A et al⁸ conducted a study to investigate the alterations in lipid profiles of patients following cholecystectomy. The lipid profiles assessed included low-density lipoprotein (LDL), triglycerides (TG), high-density lipoprotein (HDL), total cholesterol (TC), and the Chol/HDL ratio. Data on biochemical parameters, encompassing LDL, TG, HDL, and TC levels, were obtained from the hospital's recording system, alongside the computation of the Chol/HDL ratio. The study identified statistically significant changes, such as a decrease in mean LDL levels at two, four, and six months post-surgery (P = 0.029, 0.000, and 0.008, respectively), an increase in mean TG levels one week after the procedure (P = 0.034), a reduction in mean TC levels at four (P = 0.049) and six months post-cholecystectomy, and an elevation in the Chol/HDL ratio at two and twelve months postoperatively. The authors concluded that cholelithiasis is linked to dysregulated lipid profiles, and that cholecystectomy may facilitate improvements in these profiles, thereby potentially lowering the risk of future coronary artery disease.⁸

Gill GS et al.⁹ investigate the impact of cholecystectomy on lipid profiles in individuals diagnosed with gallstones. The research involved a cohort of 50 gallstone patients alongside 30 healthy controls to facilitate a comparative analysis of lipid levels. Following the surgical intervention of cholecystectomy in the gallstone patients, lipid levels were assessed both pre-operatively and post-

operatively. The findings revealed a notable reduction in total cholesterol and triglyceride levels, accompanied by an increase in high-density lipoprotein levels one month after the surgery. However, levels of low-density lipoprotein and very low-density lipoprotein did not exhibit statistically significant changes. The results suggest that cholecystectomy can lead to meaningful improvements in lipid levels among patients suffering from gallstones.⁹

CONCLUSION

Notable changes in the serum lipid profile are observed in individuals undergoing laparoscopic cholecystectomy.

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