

Comparison of Fasting Serum Lipid Profile in Gallstone Patients Before and After Cholecystectomy

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ABSTRACT

Background: Gallstones (cholelithiasis) are hardened deposits of the digestive fluid bile that can form within the gallbladder. The biliary calcium concentration plays a part in bilirubin precipitation and gallstone calcification. Hence, we planned the present study to evaluate the role of lipid in gallstone disease patients.

Materials & Methods: A total of 50 patients were included in the present study who were scheduled to undergo laparoscopic cholecystectomy. Blood samples of the patient were taken to evaluate the plasma lipid levels. Samples were taken twice i.e. preoperatively and postoperatively on the third day. Lipid Plus® analyser was used for assessment of serum lipid profile. All the results were analyzed by SPSS software.

Results: Mean age of the patients of the study group was 48.4 years. Significant results were obtained while comparing the preoperative and postoperative serum lipid profile in gall stone patients undergoing cholecystectomy.

Conclusion: Serum lipid profile is altered in patients undergoing laparoscopic cholecystectomy.

Key words: Cholecystectomy, Laparoscopic, Lipid.

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INTRODUCTION

Gallstones (cholelithiasis) are hardened deposits of the digestive fluid bile that can form within the gallbladder. Gallstone disease is often thought to be a major affliction in modern society.¹ The epidemiology of cholelithiasis has been debated for many years, many studies have been performed with the aim of defining risk factors associated with it and those which are amenable to prevention. High biliary protein and lipid concentrations are risk factors for the formation of gallstones.^{2,3} The biliary calcium concentration plays a part in bilirubin precipitation and gallstone calcification. Many patients with gallstones have increased biliary calcium, with super-saturation of calcium carbonate.⁴

The metabolic syndrome is defined by the presence of at least 3 features out of: abdominal obesity, high blood pressure, high fasting glucose, increased triglyceride levels and reduced HDL levels. Both the metabolic syndrome and diabetes mellitus are risk factors for gallstone disease.^{5,6} The correlation of cholesterol gall stones and lipid and glucose profile of the patients has been the topic of research in the many of the recent reports. Although, in comparison to the western countries, the Asian population has a particular different metabolic profile, there is currently only minimal data regarding the relationship among gall stones GD and lipid and glucose profile in Asian population.⁷⁻⁹ Hence, we planned the present study to evaluate the role of lipid in gallstone disease patients. We also aim to assess the effect of surgery (i.e. Cholecystectomy) on these parameters.

MATERIALS & METHODS

The present study was conducted in the department of general surgery Mahatma Gandhi Hospital, Bhilwara, Rajasthan, India. It included assessment of mean serum lipid profile in gall stone patients undergoing laparoscopic cholecystectomy. Ethical approval was taken from institutional ethical committee. We obtained written consent from all the patients after explaining in detail the entire research protocol. A total of 50 patients were included in the present study who were scheduled to undergo laparoscopic cholecystectomy.

Inclusion criteria

- Patients more than 18 years of age
- Patient with negative history of any type of lipid lowering agents and patients with renal failure, nephrotic syndrome
- Patient with absence of any form of systemic disorder

Complete demographic details and clinical history of all the patients was obtained. Blood samples of the patient were taken to evaluate the plasma lipid levels.

Samples were taken twice i.e. preoperatively and postoperatively on the third day. Lipid Plus® analyser was used for assessment of serum lipid profile. All the results were analyzed by SPSS software. Chi- square test and student t test were used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

RESULTS

Mean age of the patients of the study group was 48.4 years. Out of 50, 12 patients were males while the remaining were females. Mean pre-operative TC, TG, and LDL values were 173.15, 150.37 and 99.74 mg/dL respectively. On the third day of post-operative

period, Mean TC, TG, and LDL values were 168.14, 145.18 and 93.98 mg/dL respectively. Significant results were obtained while comparing the preoperative and postoperative serum lipid profile in gall stone patients undergoing cholecystectomy.

Table 1: Distribution of subjects of patients of the study group according to age

Age group (years)	Number	Percentage
<20	1	2
21- 30	6	12
31- 40	8	16
41- 50	14	28
51- 60	12	24
> 60	9	18
Total	50	100

Table 2: Distribution of patients of the study group according to gender

Gender	Number	Percentage
Male	12	24
Female	38	76
Total	50	100

Table 3: Mean Pre-operative and postoperative lipid profile in patients of study group

Parameter	Preoperative mean value	Postoperative third day mean value	P- value
TC (mg/dL)	173.15	168.14	0.01
TG (mg/dL)	150.37	145.18	0.02
LDL (mg/dL)	99.74	93.98	0.01

TC: Total cholesterol, TG: Triglycerides

DISCUSSION

The types of gallstone include cholesterol gallstones, pigment gallstones and mixed gallstones. Major constituent of gallstones are cholesterol and bilirubin (conjugated and unconjugated bilirubin). The constitutional risk factors for cholesterol gallstones include female gender, increasing age and interaction between genetic and environmental factors.¹⁰ Gall stones are associated with metabolic syndrome, which is defined as a cluster of multiple cardiovascular risk factors including central obesity, alteration in fasting plasma glucose, blood pressure, high density lipoprotein-cholesterol and serum triglyceride (TG) levels. Supersaturation of bile in cholesterol, enhanced nucleation of cholesterol crystals, impaired gallbladder emptying with stasis and intestinal hypomotility are the pathogenetic mechanisms responsible for cholesterol gallstone formation.^{11,12} Hence; we planned the present study to evaluate the role of lipid in gallstone disease patients undergoing laparoscopic cholecystectomy.

In the present study, we observed that the mean serum lipid profile of the patients showed a significant fall on the third postoperative day of the patients undergoing cholecystectomy. Al-Atrakchey RN et al (2014) estimated lipid profile and fasting blood sugar in the sera of patients with cholelithiasis in comparison with normal individuals (control). In this study, 104(male=16, female=88) were symptomatic gallstone patients (aged 42.79± 12.18 years), and 38(male=6 and female=32) were apparently

healthy controls (aged 40.03± 7.47 years). Blood samples were collected from symptomatic gallstones patients before their cholecystectomy operation. Overnight fasting, blood samples were collected from all subjects to evaluate serum lipid profile: Total cholesterol (TC), triglyceride (TG), high density lipoprotein-cholesterol (HDL-c), low density lipoprotein-cholesterol (LDL-c), very low density lipoprotein-cholesterol (VLDL-c) and fasting serum glucose (FSG). There was a significant increase (P<0.05) in serum: TC, TG, LDL-c, VLDL-c and FSG of patients with cholelithiasis compared to the apparently healthy controls. The study also showed that there was a significant decrease (P<0.05) in serum HDL-c in gallstone patients compared to control. In conclusion, cholelithiasis was associated with lipid profile and fasting serum glucose abnormality that be the cause or the effect of gallstone formation. These findings should be taken into consideration while treating gallstone patients.¹³ Shen C et al (2014) analyzed the association between cholecystectomy and metabolic syndrome in a Chinese population of 5672 subjects who undergone annual health checkups at the First Affiliated Hospital, College of Medicine, Zhejiang University between January 2011 and December 2012. The prevalence's of gallstones, cholecystectomy and metabolic syndrome were 6.0%, 3.6%, and 32.5%, respectively. The prevalence of metabolic syndrome was significantly higher in subjects with a history of cholecystectomy (63.5%) than in those with gallstones (47.0%) or in those without

gallstone disease. Multivariate logistic regression analysis showed that cholecystectomy was significantly associated with increased risk of metabolic syndrome. However, the association of gallstones with metabolic syndrome was not statistically significant. Altogether, our results suggest that cholecystectomy significantly increases the risk of metabolic syndrome.¹⁴

Shabanzadeh DM et al (2016) identified further determinants for gallstones in a Danish cohort and to perform a meta-analysis of results from existing cohorts. Data from a cohort study was used. Gallstone incidence was assessed through repeated ultrasound examinations. Body mass index (BMI), blood pressure, self-rated health, lifestyle variables, blood lipids, and use of female sex hormones were measured at the baseline examination. Independent positive determinants for incident gallstones were age, female sex, non-high density lipoprotein (non-HDL) cholesterol, and gallbladder polyps. No significant associations were found for blood pressure, smoking, alcohol consumption, HDL cholesterol, or triglycerides in meta-analyses. Age, female sex, BMI, non-HDL cholesterol, and polyps are independent determinants for gallstone formation. Incident gallstones and the metabolic syndrome share common risk factors.¹⁵ Gill GS et al (2017) 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.¹⁵

CONCLUSION

From the above results, the authors conclude that serum lipid profile is altered in patients undergoing laparoscopic cholecystectomy. However, we recommend future studies.

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