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Original Research

ASSESSMENT OF SERUM LIPID PROFILE IN GALLSTONE PATIENTS UNDERGOING LAPAROSCOPIC CHOLECYSTECTOMY

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ABSTRACT:

Background: 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. 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. Hence; we planned the present study to evaluate the role of fasting lipids in gallstone disease patients. **Materials & methods:** The present study included assessment of serum lipid profile of the gallstone patient scheduled to undergo laparoscopic cholecystectomy. A total of 50 gall stone patients were included in the present study. Detailed history with demographic profile of patient was recorded in the proforma with simultaneous recording of hematological parameters i.e., complete blood count, Renal function tests, Blood glucose, Serum electrolytes, Lipid profile, Liver function tests and Triple viral markers. Three blood samples of the patient were taken to evaluate the blood glucose level and plasma lipid levels; Pre-operatively, Postoperatively on day 3 and at one month respectively. Fasting venous blood samples (10 ml) were collected under strict aseptic precautions and were sent to the central laboratory for further analysis. **Results:** Significant results were obtained while comparing the lipid profile pre-operatively and post- operatively on third day. A further significant decrease in the lipid profile was seen at one month time. **Conclusion:** Alteration in the serum lipid profile does occur in gallstone patients.

Key words: Cholelithiasis, Lipid profile

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INTRODUCTION

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. Bile is a fluid like substance that aids in fat digestion and absorption. The gallbladder stores about 50ml of bile, which is released into duodenum after cholecystokinin (CCK) secretion when food enters the digestive tract. After being stored in the gallbladder, bile become more concentrated compared to when it left the liver, thus increasing its potency and intensifying its effect on fat.¹⁻³ Gallstones are composed mainly of cholesterol, bilirubin, and calcium salts, with smaller amounts of protein and other materials. 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.⁴ Conflicting results have also been reported in the past studies, whereby the mean concentration of total serum cholesterol was

similar in patients with and those without gallstone disease. There is a paucity of information on association of abnormal lipid profile parameters and blood glucose levels with gallstone disease.⁵⁻⁷

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. Hence; we planned the present study to evaluate the role of fasting lipids in gallstone disease patients.

MATERIALS & METHODS

The present study was conducted in the department of general surgery of the medical institute and it included assessment of serum lipid profile of the gallstone patient scheduled to undergo laparoscopic cholecystectomy. A total of 50 gall stone patients were included in the present study. Ethical approval was taken from institutional ethical committee and written consent was obtained from all the

patients after explaining in detail the entire research protocol. Detailed history with demographic profile of patient was recorded in the proforma with simultaneous recording of hematological parameters i.e., complete blood count, Renal function tests, Blood glucose, Serum electrolytes, Lipid profile, Liver function tests and Triple viral markers. Three blood samples of the patient were taken to evaluate the blood glucose level and plasma lipid levels; Pre-operatively, Postoperatively on day 3 and at one month respectively. Fasting venous blood samples (10 ml) were collected under strict aseptic precautions and were sent to the central laboratory for further analysis. All the results were analysed by SPSS software 17.0. 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

Majority of the patients of the study group belonged to the age group of more than 40 years. Mean age of the patients of the present study was 45.8 years. 76 percent of the patients of the study group were females while remaining were males. Significant results were obtained while comparing the lipid profile pre-operatively and post-operatively on third day. A further significant decrease in the lipid profile was seen at one month time.

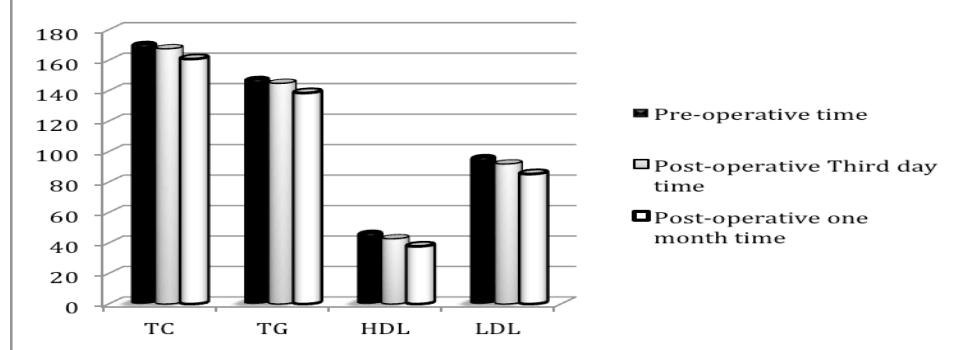
Table 1: Distribution of subjects of patients of the study group according to age

Table 3: Comparison of lipid profile in the study group at different time intervals

Parameter	Pre-operative time	Post-operative Third day time	Post-operative one month time	P-value
TC(mg/dl)	170.8	167.5	160.8	0.01
TG(mg/dl)	147.8	144.8	138.5	0.00
HDL (mg/dl)	46.8	42.8	37.8	0.02
LDL(mg/dl)	96.5	91.9	85.3	0.00

TC: Total Cholesterol, TG: Triglycerides, HDL: High-density lipoproteins, LDL: Low-density lipoproteins

Graph 1: Comparison of lipid profile in the study group at different time intervals



DISCUSSION

The constitutional risk factors for cholesterol gallstones include female gender, increasing age and interaction

Age group	Number	Percentage
<20	8	16
21- 40	12	24
41- 60	15	30
> 60	15	60
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

between genetic and environmental factors. Gall stones are associated with metabolic syndrome, which is defined as a cluster of multiple cardiovascular risk factors including central obesity, elevated fasting plasma glucose, high blood

pressure, lower high density lipoprotein-cholesterol (HDL-c) and higher 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.^{8, 9} Higher prevalence of gall stones in females was observed in the present study, in comparisons to males. This is in accordance with the results obtained by other studies, in which authors had advocated that pregnancies and oestrogens levels are attributed as the cause of occurrence of this difference. Oestrogen increases the biliary cholesterol secretion causing cholesterol super-saturation of bile.¹⁰

The elevation of serum total cholesterol and TG levels in patients may be due to abnormal secretory mechanism in gall stone patients, for bile acids and phospholipids, decrease bile acids and phospholipids (which solubilize cholesterol in the bile) will increase cholesterol precipitation, and some of gallstone patients may present with metabolic syndrome which is a cluster of symptoms such as glucose intolerance, high total cholesterol, hyperinsulinemia, increased VLDL and/or total cholesterol, decrease HDL and hypertension who indicate that the metabolic syndrome is one of the risk factors for gallstone disease.^{11, 12}

In another study authors 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.¹³

Authors from one of the previous study compared the serum lipid abnormalities in females who have cholelithiasis with controls. A retrospective study of females who underwent cholecystectomy for gallstone disease was carried out. A total of 133 patients were divided into two age groups ≤ 40 and >40 years. In age group ≤ 40 years, there were 72 cases with no controls, whereas, in >40 years, 61 cases were compared with 67 controls. The serum lipid profile were collected and compared according to the age groups. In age group >40 years serum LDL of gallstone patients were statistically significantly raised ($P < 0.05$) (95% CI -22.077; -850) compared with controls and serum total cholesterol and triglycerides were not statistically significantly high ($P > 0.05$). Serum HDL and VLDL were lower in gallstone patients but not statistically significant ($P > 0.05$) compared to control group. The study showed that serum LDL level was statistically significant in females >40 years of age, whereas other parameters were not statistically significantly different.¹⁴

The serum lipid and serum glucose levels in patients with and without gallstone were compared in of the previous studies. A total of 71 patients with gallstone (Group A) and 96 without gallstone (Group B) were studied prospectively. Patients in both groups were investigated for GSD. Total

cholesterol (TC), triglycerides (TG), high density lipoprotein cholesterol (HDL-c), low density lipoprotein cholesterol (LDL-c), atherogenic index (AI) and fasting glucose (FG) levels were estimated in both groups pre-operatively. Further, same parameters were studied in Group A post-operatively at 1 week and 1 month intervals. The serum levels of TC, TGs, LDL-c, AI and FG were found to be higher and levels of serum HDL-c were lower in gallstone patients than that of the control group, though not statistically significant. In patients with gallstone, significant decrease in TC, LDL-c, TG, AI and increase in HDL-c levels were observed post-cholecystectomy at both intervals. Post-operatively, rise in serum glucose levels at 1 week interval and decrease at 1 month interval were noticed in patients with GSD. GSD is associated with abnormal lipid profile and serum glucose. Cholecystectomy leads to a significant decrease in these parameters except HDL-c in patients with GSD.¹⁵

In another study conducted in the past literature, authors 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 prevalences 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, their results suggested that cholecystectomy significantly increases the risk of metabolic syndrome.¹⁶

CONCLUSION

Under the light of above obtained results, the authors concluded that alteration in the serum lipid profile do occur in gallstone patients. However; further studies are recommended.

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