

Analysis of Serum Lipid Profile in Cholelithiasis Patients

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ABSTRACT

Background: Gallstone diseases being common disorder, multiple studies have shown an association between gallstones and abnormal lipids. This study is to compare the serum lipid abnormalities in females who have cholelithiasis with controls.

Methods: 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. The groups were compared by using Student's t-test, $p < 0.05$ was considered statistically significant.

Results: 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.

Conclusions: The study showed that serum LDL level was statistically significant in females > 40 years of age, whereas other parameters were not statistically significantly different.

Keywords: cholecystectomy; gallstone disease; serum lipid profile.

INTRODUCTION

Gallstone disease is one of the most common gastrointestinal disorders, prevalent in about 10-15% of adults in the developed countries.¹ Most of the patients with this disease are asymptomatic.² The role of serum lipids in the aetiology of cholelithiasis is very important and in cholesterol gallstones serum lipids are altered which is suggestive of metabolic syndrome.

It is now widely accepted that the primary event in the pathogenesis of cholesterol gallstones is an altered lipid metabolism because of which there is a relative increase in the cholesterol levels compared to other lipids secreted by the liver into the bile.³ Cholesterol is water insoluble lipid, and is taken in mixed micelles and vesicles. Micelles are aggregates of phospholipids, bile

salts, and cholesterol, and vesicles are closed spherical bi-layers of phospholipids with associated cholesterol. There are three stages of gallstone formation, super saturation, nucleation and aggregation.⁴ Evidence from over 30 years ago showed that over half of patients with gallstones would have a lipid disorder.⁵ This would increase their risk of developing coronary heart disease and stroke.⁶⁻¹²

The aim of the study is to compare the lipid abnormalities in female patients with gall stone over 40 years with controls.

METHODS

A retrospective study was done on females who underwent cholecystectomy for cholelithiasis from

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January 2010 to December 2011. Written informed consent was taken from the entire participant. Total of 133 gall stone patients were divided into two groups, i.e. ≤ 40 and >40 years. In the age group <40 years there were 72 patients with no similar age group to compare. In the age group >40 years, serum lipid profile of 61 cases was compared with 67 controls of similar age without gallstone and other medical diseases.

The total lipid profile included total cholesterol, triglycerides (TG), low-density lipoproteins (LDL), high density lipoproteins (HDL), and very low density lipoproteins (VLDL) of the patients as well as control group. The fasting serum lipid profile sample was collected along with the preoperative investigations. Total lipid profile was determined by enzymatic colorimetric test. All the chemicals and reagent were supplied by Human Gesellschaft für Biochemica und Diagnostica mbH, Germany.

Results were expressed as mean \pm SD. Student's t-test was used to compare the data between cases and control groups, $p < 0.05$ was considered statistically significant.

RESULTS

In the age group >40 years, the mean age was 51.81 and 47.78 years in the case and control respectively. The comparison of total serum lipid profile in the age group >40 years showed that the mean serum levels of total cholesterol and were triglycerides high but not statistically significant ($P > 0.05$) between the two groups, however LDL level showed statistically significantly difference ($P < 0.05$). The serum HDL, VLDL level in a gall stone patients was observed to be lower than the control which was not statistically significant ($P > 0.05$) (Table 1). The mean total cholesterol, triglycerides, LDL, HDL, and VLDL of patients of age ≤ 40 years (Table 2).

Table 1. Comparison of age group between the case and control >40 years.

	Case (61) Mean (SD)	Control (67) Mean (SD)	P value	95% CI
Total cholesterol	189.33 (34.037)	178.57 (28.566)	0.054	-21.719; .198
Triglyceride	130.39 (48.538)	125.19 (42.241)	0.518	-21.081; 10.683
LDL	113.51 (32.717)	102.04 (27.934)	0.034	-22.077; -.850
HDL	42.20 (3.390)	43.06 (2.392)	0.096	-.156; 1.882
VLDL	26.77 (8.939)	29.82 (10.600)	0.082	-.397; 6.498

Table 2. The serum lipid profile in age group < 40 years (n=72).

Lipid profiles	Mean	Std. Deviation
Total Cholesterol	153.92	22.482
Triglycerides	89.97	24.103
LDL	97.65	25.302
HDL	41.92	3.397
VLDL	24.36	5.827

DISCUSSION

Gall stone disease is one of the most common and most expensive conditions to treat of all digestive disorders requiring admission to hospital.¹³ Of all gallstones found during cholecystectomy, cholesterol gallstones account for 80-90%.¹⁴ Cholesterol gallstones are primarily made up of cholesterol crystals (70%) which are held together in an organic matrix of glycoproteins, calcium salts, and bile pigments. They could be present either singly or multiply, in various sizes, shapes and surfaces.¹⁵

The mean serum total cholesterol, serum triglycerides was high in gall stone patient but not significant, compared to control group. Similarly one of the case-control studies reported lower concentrations for total cholesterol in gallstone patients than in control subjects in both genders separately.¹⁶

In the study, LDL cholesterol was significantly high in the case than the control group. Some study found a positive association between gallstone disease and increased levels of serum triglycerides, LDL cholesterol and decreased HDL cholesterol.¹⁷ Some investigators reported a positive association between gallstone and serum triglycerides levels,⁵ whereas, others found no such association.^{18,19} In the study, the mean serum HDL and VLDL of the case group were lower than the control group. Chen et al, also found a positive association between gallstone disease and decreased HDL cholesterol levels.²⁰

The etiology of cholesterol gallstones is considered to be multifactorial, with interaction of genetic and environmental factors.²¹ The major risk factors for cholesterol gallstone disease are age, female gender and parity.²² The comparison between the two age groups with gallstone was done in which the total serum lipid profile among the age group >40 years are higher than the age group ≤ 40 years in gallstone patients. The risk of cholesterol gallstone disease increases with age, obesity, type 2 diabetes, dyslipidemia, hyperinsulinemia, and sedentary lifestyle, similar to atherosclerosis.^{23,24}

CONCLUSIONS

The present study demonstrates that the serum LDL level was found to be statistically significantly high in females >40 years of age ($p=0.034$) (95% CI -22.077; -850). There were no statistically significant differences in other parameters. Considering the major role of LDL in coronary artery disease, it would be prudent to screen all patients with cholelithiasis for dyslipidemia. This might help in instituting primary preventive measures.

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