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A Prospective Observational Analysis of Serum Lipid Profile in Parients with Gall Stone Disease at Tertiary Care Hospital Ajmer, Rajasthan

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Abstract

Background: 80 percent of gallstones are made of cholesterol, whereas 20 percent of gallstones are made of calcium salts and bilirubin. Gallstone diseases being common disorders might have an association with abnormal lipids.

Materials and methods: The is a case control study, the sample size was taken for convenience during the study, and was carried out in the Department of Biochemistry among the healthy individuals and patients of gallstones attending the OPD of General Surgery. Blood sample collected after overnight fasting from each of the participants to measure the serum lipid parameters. Student's t-test was used to examine the degree of significance. P values less than 0.05 was considered significant.

Result: Levels of serum triglyceride and levels of HDL are statistically significant ($p < 0.05$), while the levels of serum cholesterol and LDL are not statistically significant ($p > 0.05$).

Conclusion: It is concluded that gallstone disease is associated with altered serum lipid profile namely hyperlipidemia or dyslipidemia which requires correction by dietary management, use of anti-hyperlipidemic drugs to achieve long lasting cure and to prevent possible future recurrences.

Keywords: Gallstone disease (GSD), dyslipidemia, management.

Introduction

The Presence of stones in the gallbladder is referred to as cholelithiasis (from the Greek: chol-, "bile" + lith-, "stone" + iasis-, "process").[1] Gallstone disease is a

chronic recurrent hepatobiliary disease, the basis for which is the impaired metabolism of cholesterol, bilirubin and bile acids, which is characterized by the formation of gallstones in the gallbladder, hepatic bile duct or common bile duct.[2]

Gallstone disease (GSD) is one of the most common gastrointestinal diseases. Gallstones represent a significant burden for health care systems worldwide and are one of the most common disorders presenting to emergency room. It was once considered a disease of western world but due to changes in food pattern, now it is becoming an increasingly common cause of morbidity, leading to hospital admission in the developing world. It is one of the most common disorders of gastrointestinal tract, affecting 10% people in western society. Its occurrence in Asian population ranges from approximately 3-15%.[3,4]

The paucity of information regarding the Serum lipid profile in Cholelithiasis patients, the present study is design to investigate the relationship between the Biochemical markers and Cholelithiasis patients.

Material and methods

Study design: Hospital based cross-sectional study.

Inclusion Criteria

Cases: Fifty (50) cases of clinically and radiologically diagnosed gallstone patients included in the study.

Controls: Fifty (50) no's, selected randomly between 20 to 70 years of age, they were admitted to this hospital for treatment for other disease were included in the study.

Exclusion Criteria

Patients not willing for study.

Patients on anti- lipidemic drugs

After collection of 5ml of fasting venous sample from a large peripheral vein under aseptic precautions the sample was subjected to centrifugation and serum was obtained.

Serum lipid parameters such as Total serum cholesterol (T-C), High density lipoprotein cholesterol (HDL-C), Low density lipoprotein cholesterol (LDL-C), Serum triglyceride (TG) were estimated in the department of Biochemistry, by using TBA-120 FR Toshiba autoanalyser.

Written informed consent was obtained in the language understood by the patient, after approval from institutional ethical committee. Patient's particular, clinical details and examination findings were recorded on standardized proforma.

Data were analyzed with application of Mean, Proportion**,** Chi-square and t-test using Microsoft Excel.

Results

Table 1: Distribution of the cases according to gender-

Group	Male		Female		Total		P-Value
	No	Percentage	No	Percentage	No	Percentage	0.7256
Cases	18	36.00%	32	64.00%	50	100%	
Control	20	40.00%	30	60.00%	50	100%	

This table shows gender wise distributions of both control and case groups. Both groups comprise 100 subjects in each. In Case group male are 18 and female are 32 out of 50 cases. In control group male are 20 and female are 30 out of 50 cases. Gender differences between both the groups were found statistically insignificant. (p>0.05)

Table 2: Distribution of the cases and controls according their serum cholesterol (mg/dl)

Group	Cholesterol (Mg/Dl)		P-Value
	Mean	Sd	
Case	259.8	110.5	0.0001
Control	147.3	31.21	

This table shows serum cholesterol level is significantly higher in case group (259.8± 110.5) as compare to control group ((147.3±31.21).

Table 3: Distribution of the cases and controls according their serum triglyceride (mg/dl)

Group	TG(mg/dl)		P-Value
	Mean	SD	
Case	129.1	84.81	0.0001
Control	77.21	21.82	

This table shows serum triglyceride level is significantly higher in case group (129.1±84.81) as compare to control group (77.21±21.82).

Table 4 : Distribution of the cases and controls according their serum HDL (mg/dl)

Group	HDL(mg/dl)		P-Value
	Mean	SD	
Case	43.78	23.12	0.6047
Control	44.74	23.222	

This table shows insignificant HDL level difference in case group (43.78±23.12) as compare to control group (44.74.±3.222).

Table 5: Distribution of the cases and controls according their serum LDL (mg/dl)

Group	LDL(mg/dl)		P-Value
	Mean	SD	
Case	183.2	97.93	0.0001
Control	183.2	30.16	

This table shows serum LDL level significantly higher in case group (183.2± 97.93) as compare to control group (86.97± 30.16).

Table 6: Distribution of the cases and controls according their serum VLDL (mg/dl)

Group	VLDL(mg/dl)		P-Value
	Mean	SD	
Case	25.94	16.86	0.0001
Control	15.51	4.638	

This table shows serum VLDL level significantly higher in case group (25.94±16.86) as compare to control group (15.51± 4.638).

Discussion

The Hospital based case control study was carried at Department of General surgery, J L N Medical College and associated group of Hospital, Ajmer, Rajasthan.

The subjects were divided into two groups on the basis of presence of cholelithiasis. One group comprised 50 patients of cholelithiasis in the case group and other had 50 healthy subjects in the control group.

In this study the levels of serum lipid profile; total cholesterol, triglycerides, high density lipoprotein cholesterol, low-density lipoprotein and very low-density lipoprotein cholesterol were measured in patients (case) and controls group.

In present study comparison of serum lipid profile between case and controls group showed that the levels of serum total cholesterol (259.8± 110.5) in cholelithiasis patients were significantly higher ($p < 0.05$) than control group (147.3±31.21).

Several studies that have evaluated the role of diet as a potential risk factor for gallstone formation, including energy intake, cholesterol, fatty acids, fiber, carbohydrates, vitamins and minerals, and alcohol intake. The association between cholesterol intake and gallstone disease has been variable in different studies.

Recent discoveries of the role of orphan nuclear receptors in the regulation of fatty acid and hepatic cholesterol metabolism and excretion open new perspectives for a better understanding of the role of dietary constituents on cholesterol gallstone formation.[5]

The present study observe comparatively low serum HDL level in patients with cholelithiasis (43.78±23.12) than control group (44.74±3.222), but there was no significant variation in total cholesterol ($p > 0.05$) between case and controls group.

The present study observes significantly high serum triglyceride level in Case group (129.1±84.81) than control group (77.21±21.82). Comparison of serum lipid profile between case and controls group showed that the levels of LDL (183.2± 97.93) in cholelithiasis patients were higher than that of the control group (86.47±30.16), there was significant variation in total cholesterol ($p < 0.05$) between case and controls group.

The present study also observes significantly high level of VLDL in case group (25.94±16.86) than control group (15.51±4.638).

The present study observe low serum HDL levels and high serum triglyceride, total Serum cholesterol, LDL and VLDL levels in patients with cholelithiasis which is in concord with other studies.[5,6]

Virupaksha HS et al[7] found a significant increase in total cholesterol ($p<0.01$), LDL cholesterol ($p<0.01$) and an significant decrease in HDL cholesterol ($p<0.01$) in cholelithiasis patients as compared to control subjects.

The elevation of serum total cholesterol and TG levels in patients may be due to: Gallstone patients have abnormal secretory mechanism for bile acids and phospholipids, decrease bile acids and phospholipids (which solubilize cholesterol in the bile) will increase cholesterol precipitation,[8] 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.[9]

Previous study described a decrease in HDL in gallstone patients, and there will be a return to the normal condition after gallstone removal.[10] The high LDL was seen in gallstone patients in this study either due to abnormal secretary function and/or prolonged high fatty diet and agree with Zhao et al, and down regulation of LDL-ApoB receptors by inhibition of LDL-ApoB receptor gene expression. Hyperlipidemia are strong risk factors in cholelithiasis as estimated previously.[3] Life style and dietary modification are effective measures for the prevention of cholelithiasis . The previous observations indicate that medications used to treat dyslipidemia may be of value in the prevention and treatment of cholelithiasis.[11] Cholelithiasis is associated with hypertriglyceridemia . Hypertriglyceridemia is associated with decreased HDL-cholesterol (HDL-c) and increased small dense LDL.[12] LDL particles are formed as VLDL lipoproteins lose triglyceride through the action of lipoprotein lipase and they become smaller and denser (fewer fat molecules with same protein transport shell), containing a higher proportion of cholesterol esters.[13,14]

Conclusion

In conclusion, cholelithiasis disease is associated with some biochemical abnormalities i.e. elevated total cholesterol, triglyceride, LDL, VLDL when compared to control.

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