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LIPOPROTEIN ABNORMALITIES IN CHRONIC RENAL FAILURE

Dr. Antony Jacob[1], Dr. Anakha Kaladharan[2]*, Dr. Shajahan O. M.[3] and Dr. K. Mukesh[4]

[1]Consultant Physician, Samaritan Hospital, Kochi, Kerala.
[2]Clinical Pharmacist, Department of Clinical Pharmacology, Vijaya Group of Hospitals, Chennai, Tamil Nadu.
[3]Consultant Clinical Pharmacologist, HOD- Clinical Pharmacology, Vijaya Group of Hospitals, Chennai, Tamil Nadu.
[4]Clinical Pharmacist, Department of Clinical Pharmacology, Vijaya Group of Hospitals, Chennai, Tamil Nadu.

*Corresponding Author: Dr. Anakha Kaladharan

Clinical Pharmacist, Department of Clinical Pharmacology, Vijaya Group of Hospitals, Chennai, Tamil Nadu.

ABSTRACT

Background: Chronic renal failure (CRF) is a permanent decline in renal function caused by the renal tissue's defective functioning. The resulting weakening of the kidney's excretory, metabolic, and endocrine functions leads to the development of the uremia clinical syndrome. **Aim and Objective:** A study of patients with chronic renal failure was carried out to analyze the changes in different lipoprotein fractions. **Methods:** 50 Cases of chronic renal failure were taken for study. These patients were divided into two groups. One group consisting of 25 Patients who were on conservative treatment, and the other group of 25 patients were on regular short term hemodialysis (6 months - 2 years). Cases of chronic renal failure admitted in the medical wards of Vinayaka Mission Kirupanandha Variyar Medical College and Hospitals, Salem from April 2015 to April 2016 were taken for study. **Results:** CRF patients had significantly higher plasma triglycerides, LDL, and VLDL fractions than controls. In CRF patients, plasma HDL levels were significantly lower than in controls. In terms of total cholesterol, there was no significant difference between CRF and controls. The ratio of HDL to total cholesterol was lowered significantly. **Conclusion:** Both conservative and hemodialysis CRF patients had excess triglycerides, LDL, and VLDL. Both conservative and hemodialysis CRF groups had reduced HDL cholesterol. HDL-to-total cholesterol ratio dropped. Hypertriglyceridemia causes atherosclerosis. Proper treatment of uremic dyslipidemia is crucial for preventing or postponing cardiovascular complications in CRF patients.

KEYWORDS: Hypertriglyceridemia, VLDL, CRF, LDL, Lipoproteins.

INTRODUCTION

In chronic renal disease, cardiovascular disease is the leading cause of morbidity and mortality. Renal failure has long-term implications that can be seen in every organ system in the body. Lipoprotein metabolism abnormalities may play a role in the high prevalence of cardiovascular disease, which exacerbates chronic renal failure.[1] However, hypercholesterolemia, the most commonly recognised lipid risk factor in the general population, is uncommon among such people, and whether uraemic lipid abnormalities should be addressed has been a point of contention. Hyperphosphatemia, secondary hyperparathyroidism, hypocalcemia, and dyslipidemia are all metabolic abnormalities seen in patients with severe CKD.[2]

The emerging recognition that dyslipidemia is a key risk factor for coronary heart disease has sparked an interest in identifying and treating abnormalities in plasma lipids and lipoproteins.[3]

The most noticeable anomaly in individuals with CRF on hemodialysis is hypertriglyceridemia, which is frequently substantial, but hypercholesterolemia is uncommon.[4] Despite the fact that chronic hemodialysis (HD) may reduce triglyceride (TG) levels modestly, peritoneal dialysis (PD) causes hypertriglyceridemia due to glucose overload.[5]

As a result, the current study was carried out to notice the differences in lipoprotein fractions among chronic renal failure patients.

MATERIALS AND METHODS

50 Cases of chronic renal failure were taken for study. These patients were divided into two groups. One group consisting of 25 patients who were on conservative treatment, and the other group of 25 patients were on regular short term hemodialysis (6 months - 2 years). Cases of chronic renal failure admitted in the medical wards of Vinayaka Mission Kirupanandha Variyar Medical College and Hospitals, Salem from April 2015 to April 2016 were taken for study.

The control group consisted of 25 healthy individuals whose ages and genders were matched to those of the study group. The fasting serum lipid levels were determined, and these included total cholesterol, triglycerides, low density lipoprotein (LDL), very low density lipoprotein (VLDL), and high density lipoprotein (HDL) cholesterol levels (HDL).

Exclusion criteria for the study included patients with diabetes, ischemic heart disease, who had undergone coronary artery bypass graft surgery, who were taking lipid-lowering medications, who had a history of alcohol consumption and smoking as well as thyroid and liver disease, as these conditions could affect lipid profiles and alter the results. All of the patients gave their verbal informed consent to participate in this study before taking part in it.

Statistical analysis
The data was entered into Microsoft Excel after a proper template was created. The information was then imported into SPSS and analysed. Several lipid profile parameters' mean and standard deviation were computed. The Chi-square test was used to see the connection of age and sex with CKD patients on conservative therapy and on hemodialysis, and the unpaired t-test was used to see the difference in mean values of lipid analytes. Statistical significance was defined as a P-value of less than 0.05.

RESULTS AND DISCUSSION
50 Cases of chronic renal failure were taken for study. The patients were divided into two groups. One group consisting of 27 patients who were on conservative treatment, and the other group of 23 patients were on regular short term hemodialysis (6 months - 2 years).

The fasting serum lipid levels such as included total cholesterol, triglycerides, low density lipoprotein (LDL), very low density lipoprotein (VLDL), and high density lipoprotein (HDL) cholesterol levels (HDL) were estimated and compared.

Table 1: Biological Values of patients and in control group.

Parameters	Group	N	Mean ± SD	P value
Blood urea	Patients	50	184.85 ± 20.94	0.001
	Control	25	20.12 ± 2.35	
S. Creatinine	Patients	50	10.03 ± 0.16	0.001
	Control	25	1.06 ±0.13	
Total proteins	Patients	50	6.53 ± 0.11	0.001
	Control	25	6.47 ± 0.30	
S. Albumin	Patients	50	3.35 ± 0.02	0.001
	Control	25	3.92 ± 0.31	

The difference between both the mean and standard urea values in controls and patients was considered to be considerably significant. (P=0.001) In comparison to controls, patients' Creatinine levels were extremely high. This was a statistically significant difference. (P=0.001)Mean total proteins were slightly elevated on comparison to controls and were statistically significant. (P=0.001)Serum albumin levels were reduced on comparing with the control and it is found to be statistically significant.

The results of the study on the lipid profile in patients with chronic renal failure demonstrate that these patients' lipid profiles differ significantly from those of controls. In our study, the biological parameters such as Blood urea, Serum Creatinine, Total proteins and Serum albumin were elevated in patients while comparing with that of the control and they were statistically significant which was similar to the study conducted by Ravi kumar et al.[6]

Table 2: Lipid Profile data of patients and control groups.

Lipid Profile	Group	N	Mean ± SD	P value
Total cholesterol	Patients	50	230.39 ± 12.62	0.047
	Control	25	196.39 ± 9.10	
Triglycerides	Patients	50	196.14 ± 21.72	0.0031
	Control	25	126.76 ± 11.76	
HDL	Patients	50	37.51 ± 1.38	0.015
	Control	25	50.31 ± 3.06	
LDL	Patients	50	160.23 ± 15.19	0.001
	Control	25	125.12± 7.15	
VLDL	Patients	50	41.48 ± 3.99	0.026
	Control	25	31.68 ± 5.33	
HDL/TC ratio	Patients	50	0.162± 0.015	0.002
	Control	25	0.25 ± 0.012	

The Mean Total cholesterol values of patients and controls were 230.39 ± 12.62 and 196.39 ± 9.10 mg/dl respectively. The P value indicated that this difference were significant. Triglycerides values were compared with the patients and the control and they were found to be significantly high. The P value shows that they are highly statistically significant (P=0.0031).

The Total cholesterol values were raised in patients with that of controls and they were statistically significant which was similar to the Ravi kumar's study. Triglycerides values were elevated in patient group which was similar to the study of Attman PO et al [7] which stated that in adults and children with renal failure, hypertriglyceridemia is the most prevalent plasma lipid abnormality. Similar observation was also made by Gerald appel.[8]

HDL values were comparatively low (37.51 ± 1.38) in patients than that of the control group (50.31 ± 3.06). This was statistically significant(P= 0.015). LDL and VLDL values were increased in patients to that of the control groups and both were statistically significant. The HDL/TC ratio was found and there were a significant reduction in patients than the controls. However, the P value was highly significant (P= 0.002).

HDL values in patients were significantly reduced to that of control group, which was similar to the observation made by Goldberg et al.[9] The LDL levels of the patients were elevated to that of control group. This was similar to the study done by Andeson et al.[10] was the LDL levels were increased. There was a significant rise in VLDL levels which was similar to the study done by Ravi kumar et al.

The limitations of our study includes small number of sample size and inter comparison between the groups.

CONCLUSIONS
This study looked at changes in different lipoprotein fractions in chronic renal failure patients, as well as differences in lipid profiles between patients on conservative therapy and those on hemodialysis. Elevated triglycerides, LDL, and VLDL fractions were identified in individuals with chronic renal failure who were receiving either conservative or hemodialysis treatment. Furthermore, both the conservative and the hemodialysis groups of CRF subjects had relatively low HDL cholesterol levels than the control group. There were no significant differences in the Total Cholesterol. The ratio of HDL to total cholesterol was significantly lowered. The development of atherosclerosis has been linked to high triglyceride levels in the blood. The investigation of probable explanations of uremic dyslipidemia is therefore vital because appropriate treatment is critical for controlling or delaying cardiovascular issues in persons with CRF.

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