ORIGINAL RESEARCH

A Study On Lipid Abnormalities In Chronic Kidney Disease Patients

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ABSTRACT
Introduction: Atherosclerosis is an abnormality commonly encountered in patients with chronic kidney disease. The increased risk of atherosclerotic cardiovascular disease may be due to hyperlipidemia.
Aims Of The Study To estimate various lipid profile abnormalities in Chronic Kidney Disease patients. To study the correlation between the serum creatinine levels and lipid abnormalities in Chronic Kidney Disease.
Materials And Methods: This study was conducted in 50 patients with chronic kidney disease and 50 normal healthy persons. who were admitted to Mahatma Gandhi Memorial Hospital Warangal during September 2018 - September 2020. **Results And Observations** :Age of the patients varied from 15 yrs to 80 yrs. Majority of patients fall in the age group between 26-55 years. Seventy two percentage of people contribute this group.
 Discussion: In our study, most common lipid abnormalities found were low HDL levels (50%) and hypertriglyceridemia (48%).
Conclusion: HDL-C levels were lower and triglycerides, total cholesterol and LDL-C levels were higher in the study group compared to controls. All were statistically significant. Predominant lipid abnormality was reduced HDL-C levels.
Key Words :Chronic kidney disease, Dyslipidemia, Lipid profile.

INTRODUCTION

Atherosclerosis is an abnormality commonly encountered in patients with chronic kidney disease. The increased risk of atherosclerotic cardiovascular disease may be due to hyperlipidemia. Other risk factors predisposing to cardiovascular disease in chronic kidney disease patients include diabetes, hypertension, obesity and smoking. Dyslipoproteinemia is an additional risk factor for the progression of renal insufficiency. It has been shown in a large population of patients with chronic kidney disease that the rate of progression was significantly higher in hyperlipidemic patients compared with normolipidemic patients[1]. The pathogenesis of chronic allograft dysfunction is complex and results from various factors. Among them hyperlipidemia is an important factor implicated in the development and rogression of chronic allograft dysfunctions. In an observational study, it was found that hypertriglyceridemia and the Lp (a) > 30 mg/dl before and after transplantation were independent risk factors for chronic allograft dysfunction[2]. Factors such as race, gender, age and diabetic status potentially confound the interpretation of the lipoprotein profile[3]. Indian studies on lipid abnormalities in chronic kidney disease have not been consistent. Sharma et al.,[4] Kunde et al.,[5] found no hyperlipidemia whereas Gupta et al.,[6] Das et al.,[7] observed hypertriglyceridemia and reduced HDL levels in CKD patients as in western studies. In view of inconsistency and limited evidence in southern part of this country it was decided to study the lipid profile in our patients with chronic kidney disease.

AIMS OF THE STUDY

1. To estimate various lipid profile abnormalities in Chronic Kidney Disease patients.
2. To identify the predominant lipid pattern in chronic kidney disease patients.
3. To study the correlation between the serum creatinine levels and lipid abnormalities in Chronic Kidney Disease.

4. To estimate the prevalence of Left Vetricular Hypertrophy and Ischemic Changes in patients with chronic kidney disease.

MATERIALS AND METHODS
This study was conducted in 50 patients with chronic kidney disease and 50 normal healthy persons. All the patients in this study group were selected from the outpatient department and those who were admitted to MGM HOSPITAL, WARANGAL during September 2018 - September 2020. The controls were selected from the outpatient department who were accompanying the patients.

INCLUSION CRITERIA FOR PATIENTS
1. Patients between age group of 15 to 80 years with chronic kidney disease.
2. Patients with established chronic kidney disease were selected irrespective of the etiology.
3. Patients who were on conservative or dialytic treatment for chronic kidney disease. Established

renal failure was ensured by radiological evidence or biochemical evidence for more than 3 months.

EXCLUSION CRITERIA
1. Patients with Acute renal failure and Nephrotic Syndrome
2. Who are on drugs affecting lipid metabolism like □ blockers, statins and oral contraceptive pills. Written consent was obtained from both patients and controls. Detailed history regarding symptoms and duration of the kidney disease, hypertension, diabetes, smoking, alcoholism, drug intake and treatment were elicited. A detailed clinical examination was performed in all patients. Blood pressure, renal function tests, abdominal ultrasonogram, and Electrocardiogram were done for all patients. After 12 hours of overnight fasting blood sample was taken for lipid profile from patients and controls. Patients with chronic kidney disease and controls included in the study were matched according to age and the results were analyzed.

RESULTS AND OBSERVATIONS
AGE DISTRIBUTION
Age of the patients varied from 15 yrs to 80 yrs. Majority of patients fall in the age group between 26-55 years. Seventy two percentage of people contribute this group.

Age Distribution In Patients

Age in years	No. of Patients	Percentage
15-25	2	4%
26-35	13	26%
36-45	11	22%
46-55	12	24%
56-65	10	20%
66-75	1	2%
>75	1	2%

Personal Habits: In this study 40% (20 patients) of the patients were smokers and 42 % (21 patients) were alcoholics.

Renal parameters: Lowest urea value found in these patients was 17mg/dl and the highest was 230 mg/dl. Creatinine values ranged between 0.5mg/dl to 22.6 mg/dl. Mean values of creatinine was 6.74 □ 4.77 mg/dl.

Blood Pressure Readings: Patients with blood pressure of more than 140/90 were considered hypertensives. Most patients (39 patients) were hypertensives at the time of presentation. Only 11 patients had blood pressure less than 140/90mmHg.

Diabetic Status: It was found that 22 patients (44%) were diabetic and their random blood sugar levels ranged from 51mg/dl to 388 mg/dl.

Radiological Examination: Radiological examination was done by abdominal ultra sonogram. In 38 patients the kidney size was less than 9cm in one or both kidneys. Rest of them (12 patients) showed normal kidney size in USG.

ECG results: Patient's electrocardiograms were analysed. It was found that 15 patients (30%) showed left ventricular hypertrophy. 10 patients (30%) showed ischemic changes. 3 patients showed tall peaked T waves.

ECG CHANGES IN CKD PATIENTS (STUDY GROUP)

Type of ECG changes	Males	Females	Combined
LVH	10(20%)	5(10%)	15(30%)
Ischemia	6(12%)	4(8%)	10(20%)

CKD PATIENTS WITH LVH SHOWING LIPID ABNORALITIES (STUDY GROUP)

LIPID PATTERN IN OUR STUDY

Hdl Pattern: Serum HDL values ranged between 30mg/dl to 80mg/dl. Patients showed abnormal HDL levels (<40 mg/dl) were 25 (50%). Its mean value was 42.82 and standard deviation was 12.25. Among the control groups, the lowest value of HDL was 46 mg/dl and the highest was 65 mg/dl. Their mean was 54.20 and standard deviation was 4.18. Mean deviation and standard error of difference between two means were calculated. Actual difference between two mean was 8.07 and the standard error of difference between two means was 1.83. This was statistically significant since the actual difference was two times higher than the standard Error of difference between two means. T value was calculated using student's t test. It was 6.2169. P value (<0.05) wa s statistically significant. It showed that there was a significant reduction in HDL-C levels in patients with CKD than that of controls.

Type of lipid Disorders	Number of Patients	Percentage
	(out of 15)	
Elevated Cholesterol	3	20%
Elevated Triglycerides	4	27%
Decreased HDL	10	67%
Increased LDL Cholesterol	10	67%

LIPID PATTERN IN OUR STUDY

HDL PATTERN: Serum HDL values ranged between 30mg/dl to 80mg/dl. Patients showed abnormal HDL levels (<40 mg/dl) were 25 (50%). Its mean value was 42.82 and standard deviation was 12.25. Among the control groups, the lowest value of HDL was 46 mg/dl and the highest was 65 mg/dl. Their mean was 54.20 and standard deviation was 4.18. Mean deviation and standard error of difference between two means were calculated. Actual difference between two mean was 8.07 and the standard error of difference between two means was 1.83. This was statistically significant since the actual difference was two times higher than the standard Error of difference between two means. T value was calculated using student's t test. It was 6.2169. P value (<0.05) wa s statistically significant. It showed that there was a significant reduction in HDL-C levels in patients with CKD than that of controls.

LDL PATTERN: Lowest value of LDL 65 mg/dl and the highest value was 173mg/dl. Abnormally high LDL levels (>130mg/dl) were found in 22 patients and they constitute 44%. Their mean value was 131.7 mg/dl and standard deviation was 25.71.In controls, the mean and SD were 112.5 and 13.42 (Range 85 - 150mg) respectively.

Standard error of difference between two means was 3.61. Actual difference between two means was 19.2 which were (20%) two times greater than the standard error of difference between two means. Student t value was calculated (t=4.6813) and P value was (< 0.05) significant.

TOTAL CHOLESTEROL: Range of TC levels in study group was 120mg/dl to 258 mg/dl. Lowest value in control group was 119 and the highest value was 222mg/dl. Total cholesterol was more than 240mg/dl in 10 patients (20%). The mean values of study group and control group were 209.3 and 185.2mg/dl respectively. Their standard deviations were 42.9 and 15.2 respectively. Standard error of difference between two means was obtained. It was 6.44 but the actual difference was 124.1 which was more than two times higher than that of standard error of difference between the two means. T value was calculated (t =3.7442). P value was (P<0.05) significant.

DISCUSSION

DECREASED HIGH DENSITY LIPOPROTEIN LEVELS: The low HDL levels in patients with chronic kidney disease in our study were consistent with Diana M Lee LG et al70 who studied the lipid profile in CRF patients. This low HDL cholesterol levels were also an independent risk factor for the development of CKD in the Framingham off spring study. Several mechanisms may underlie these reductions in HDL cholesterol levels, which is usually an indication of impaired reverse cholesterol transport. Thus, uremic patients usually exhibit decreased levels of apolipoprotein AI & AII (the main protein constituent of HDL). Diminished activity of LCAT (the enzyme responsible for the esterification of free cholesterol in HDL particles) as well as increased activity of cholesterol ester transfer protein that facilitates the transfer of cholesterol esters from HDL to TGL rich lipoproteins that reduce serum

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concentrations of HDL cholesterol. In MDRD study71, low HDL levels in CKD patients were one of the independent risk factor for progression of kidney disease. Though in our study the mean value was 42.82, it is significantly less than the age matched healthy controls. Hypertriglyceridemia represents an early feature of renal failure. Indeed previous studies have shown that patients with impaired renal function exhibit increased concentrations of triglycerides even though serum creatinine levels were within normal limits. In addition, individuals with renal insufficiency, usually display abnormal increase in serum triglycerides levels after a fat meal (post prandial lipemia). Experimental studies revealed that accumulation of triglyceride rich lipoprotein (VLDL, chylomicrons and their remnants) in individuals with predialysis CKD is mainly due to their decreased catabolism. The down regulation of the expression of several genes along with the changes in the composition of lipoprotein particles and the direct inhibitory effect of various uremic toxins on the enzymes involved in lipid metabolism represent the most important pathophysiological mechanism underlying the development of hypertriglyceridemia in renal failure. Interestingly, it has been proposed that secondary hyperparathyroidism may also contribute to the impaired catabolism of triglyceride rich lipoproteins and that parathyroidectomy or the administration of calcium channel blocker verapamil may partially ameliorate the hypertriglyceridemia of CKD. It is well known that impaired insulin sensitivity represents an early feature of CKD. Thus it could be due to insulin resistance driven over production of VLDL may significantly contribute to the development of hypertriglyceridemia in CKD patients70.

ECG CHANGES: Out of 50 patients, 30% of patients showed changes suggestive of LVH and 20% of patients showed ischemic changes. This observation was similar to study done by Levin et al. The risk of dying of cardiac complications is 65 times higher in dialysis patients between 45-54 years and 500 times higher than the general population. The risk factors which are responsible for increased morbidity and mortality were hypertension, DM, high LDL, low HDL, smoking, LVH, male gender, old age, anemia, hypervolemia, insulin resistance and proteinuria.

CONCLUSION
1. HDL-C levels were lower and triglycerides, total cholesterol and LDL-C levels were higher in the study group compared to controls. All were statistically significant.
2. Predominant lipid abnormality was reduced HDL-C levels.
3. There was a negative correlation exists between serum HDL-C level and serum creatinine levels which was statistically significant.
4. Percentage of patients showing ECG changes of left ventricular hypertrophy and ischemia were 30% and 20 %

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