



PREVALENCE OF DYSLIPIDEMIA IN CHRONIC KIDNEY DISEASE

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ABSTRACT **BACKGROUND:** Chronic kidney disease (CKD) is a worldwide health problem with increasing incidence and prevalence. The annual mortality rate of patients undergoing dialysis is more than 20%. The leading causes of morbidity and mortality in CKD are cardiovascular diseases, primarily atherosclerotic coronary artery disease. Dyslipidemia is a common complication of CKD. It is a significant risk factor for the development of cardiovascular disease. Alteration in lipid profile correlates with declining glomerular filtration rate (GFR) and degree of proteinuria.

AIM:

- To identify the altered lipid profile in patients with chronic kidney disease.
- To note the alterations in different lipoprotein fractions in chronic kidney disease patients.
- To note the difference in lipid profile in CKD patients on conservative management and maintenance hemodialysis.

MATERIALS AND METHODS: A Hospital-based observational Prospective study was conducted in the Department of Medicine, Santhiram medical college, and general hospital for six months. Chronic kidney disease patients who are non-diabetic were taken for the study with informed and written consent taken from the patient.

RESULTS: Plasma triglycerides (153.14±54.37mg/dl) were elevated, and plasma HDL (36±43.5mg/dl) was decreased in CKD patients. There is no significant elevation of total cholesterol levels. On comparing lipid profiles of CKD patients on conservative management and hemodialysis, there was a significant increase in triglycerides in the hemodialysis group.

CONCLUSION: Significant elevation of triglycerides and VLDL was observed in patients of CKD on hemodialysis. Further, a reduced HDL cholesterol level was also observed in both conservative and hemodialysis groups of CKD patients. Dyslipidemia observed in Uremic patients may contribute to accelerated atherosclerosis and further progression of chronic renal failure.

KEYWORDS : CKD, GFR, TC, TGL, LDL, VLDL, HDL.**INTRODUCTION**

Chronic Kidney Disease is defined as "kidney damage for ≥ 3 months as defined by structural or functional abnormalities of the kidney, with or without decreased GFR or GFR less than 60ml/minute/1.73m² for ≥ 3 months, with or without kidney damage¹". Diabetes is the most common cause, followed by hypertension, chronic glomerulonephritis, chronic interstitial nephritis, heridofamilial diseases, and primary glomerular diseases. CKD is associated with dyslipidemia comprising high triglycerides, low HDL-cholesterol, and altered lipoprotein composition². Lipoprotein metabolism is altered in association with the declining glomerular filtration rate. Dyslipidemia is a potent cardiovascular risk factor. The leading cause of mortality in CKD is cardiovascular diseases, especially in end-stage renal disease. CKD is associated with dyslipidemia even at the early stages of renal dysfunction and tends to progress with renal function deterioration. Therefore, therapies to reduce cardiovascular risk are required in CKD. Clinical trial evidence suggests that the use of statins in pre-end stage CKD and post-transplant patients reduces cardiovascular risk³. Large observational studies demonstrate that statin treatment is independently associated with a 30%-50% reduction in mortality in dialysis-dependent CKD patients⁴.

AIMS AND OBJECTIVES

- To identify an altered lipid profile in patients with chronic kidney disease.
- To note the alterations in different lipoprotein fractions in chronic kidney disease patients.
- To note the difference in lipid profile in CKD patients on conservative management and maintenance hemodialysis (HD).

MATERIALS AND METHODS

A Hospital-based observational Prospective study was conducted in the Department of General Medicine, Santhiram Medical College, and General Hospital for six months after taking approval from the Hospital Ethics and Research Committee.

SAMPLING TECHNIQUE AND SAMPLE SIZE: All the selected patients fulfilling the inclusion criteria admitted in Santhiram medical

college and general hospital, Nandyal, were taken for study after taking prior informed consent. Patients were subjected to a detailed history and complete physical examination. Blood sample was drawn from the patients for the lipid profile after 12 hours of overnight fasting. The final sample size came to be 50 subjects with chronic kidney disease.

INCLUSION CRITERIA: The presence of CKD established by markers of kidney damage and level of kidney function.

- Patients who have given informed written consent.
- Albuminuria ≥ 30 mg/day
- Elevated blood urea and serum creatinine
- Ultrasonographic evidence of shrunken kidneys
- Decreased estimated GFR < 60 ml/minute/1.73m² for ≥ 3 months

EXCLUSION CRITERIA

- Patients those who did not give informed written consent.
- Patients with acute kidney injury and nephrotic syndrome
- Patients with diabetes mellitus
- Patients with ischemic heart disease
- Patients on lipid-lowering drugs
- Patients who have a history of alcohol consumption and smoking

DATA ANALYSIS

Mean values were obtained for LDL, HDL, TGL, VLDL & Total cholesterol separately. Then standard deviations were calculated for each category. An Independent t-test was applied after fulfilling the normality and equality of population variance assumption. Chi-square test is applied to evaluate the association of different study parameters. A p-value of < 0.05 was considered significant.

RESULTS

Fifty patients with CKD were taken for the present study. Lipid levels like total cholesterol (TC), triglycerides (TGL), high-density lipoprotein (HDL), low-density lipoprotein (LDL), and very-low-density lipoprotein (VLDL) were estimated. Out of 50 patients, 35 patients (70%) were male, and 15 patients (30%) were female. The male to female ratio was 2.3:1. The maximum number of CKD patients

were in the age group of 21-30 years (26%). The mean age for the total number of patients was 43.64±16.57 years. Mean values of blood urea and serum creatinine in the study group were 130.36±36.24 mg/dl and 10.27±4.31 mg/dl, respectively. The prevalence of dyslipidemia in the study population is 56%, i.e., 28 patients had an abnormal lipid profile, of which 15 patients were under conservative treatment, and 13 were undergoing hemodialysis.

Out of 50 patients, 9 patients (18%) were in stage 3, 19 patients (38%) were in stage 4, and 22 patients (44%) were in stage 5. When comparing the prevalence of dyslipidemia and staging of CKD, it was observed that 4 patients (14.3%) of stage 3, 11 patients (39.3%) of stage 4, and 13 patients (46.4%) of stage 5 had an abnormal lipid profile.

Table 1. Total cholesterol levels of the study population

TC (mg/dl)	Male	Percent(%)	Female	%	Total	%
Desirable (<200)	29	82.8%	12	80%	41	82%
Borderline high (200-239)	3	8.6%	2	13.3%	5	10%
High (>240)	3	8.6%	1	6.7%	4	8%
Total	35	100%	15	100%	50	100%

The mean TC value of the study group is 175.5±38.88 mg/dl. Out of 50 patients, 41 patients (82%) had normal TC levels, 5 patients (10%) had borderline high levels, and 4 patients (8%) had high TC levels.

Table 2. Serum Triglyceride levels of the study population

TGL (mg/dl)	Male	%	Female	%	Total	%
Normal (<150)	22	62.9%	11	73.4%	33	66%
Borderline high (150-199)	7	20%	2	13.3%	9	18%
High (200-499)	6	17.1%	2	13.3%	8	16%
Total	35	100%	15	100%	50	100%

The mean TGL value of the study group is 153.14±54.37 mg/dl. Out of 50 patients, 33 patients (66%) had normal TGL values, and 9 patients (18%) had borderline high and 8 patients (16%) had high TGL levels.

Table 3. Serum High-Density Lipoprotein levels of the study population

Serum HDL (mg/dl)	Male	%	Female	%	Total	%
<40	15	42.9%	6	40%	21	42%
41-50	5	14.2%	2	13.3%	7	14%
51-60	15	42.9%	7	46.7%	22	44%
Total	35	100%	15	100%	50	100%

Mean HDL value of the study group is 44.48±10.26 mg/dl. Out of 50 patients, 21 patients (42%) had HDL values <40 mg/dl and 7 patients (14%) had HDL levels between 51-60 mg/dl and 22 patients (44%) had HDL levels above 50 mg/dl.

Table 4. Serum Low-Density Lipoprotein levels of the study population

Serum LDL (mg/dl)	Male	%	Female	%	Total	%
Desirable (60-130)	30	85.7%	12	80%	42	84%
Borderline high (130-159)	2	5.7%	2	13.3%	4	8%
High (160-189)	2	5.7%	1	6.7%	3	6%
Very high (≥190)	1	2.9%	0	0	1	2%
Total	35	100%	15	100%	50	100%

The mean LDL value of the study group is 114.22±30.07 mg/dl. Out of 50 patients, 42 patients (84%) had LDL values in the desirable range, and 4 patients (8%) had borderline high, 3 patients (6%) had high and 1 patient (2%) had very high LDL levels.

Table 5. Lipid profile of CKD patients on conservative treatment and hemodialysis

Lipids (Mean±SD) mg/dl	Conservative treatment	HD	P-value
TC	182.03±43.3	167.18±31.41	0.183
TG	136.14±42.45	174.77±60.88	0.011
HDL	46±11.03	42.54±9.07	0.241
LDL	121.60±34.97	104.81±19.28	0.049
VLDL	25.71±8.94	34.04±12.74	0.009

Mean TGL levels of the patients on conservative treatment and HD were 136.14±42.45 mg/dl and 174.77±60.88 mg/dl, respectively. This

difference is statistically significant. HDL levels were found to be much lower in patients undergoing hemodialysis compared to those under conservative treatment with mean values of 42.54±9.07 mg/dl and 46±11.03 mg/dl, respectively. This difference is not statistically significant. There is a significant elevation of VLDL in patients undergoing hemodialysis compared to those under conservative management with mean values of 34.04±12.74 mg/dl and 25.71±8.94 mg/dl, respectively. Rashmi et al.⁵, in their study, that hypertriglyceridemia and reduced HDL rather than increased total cholesterol and LDL are responsible for cardiovascular complications in patients with CKD.

DISCUSSION

In the present study, the lipid profile of 50 CKD patients showed an increase in triglycerides and decreased HDL levels. It was observed that an increase in triglyceride and VLDL levels is relatively higher in patients undergoing HD than in patients undergoing conservative management. The prevalence of dyslipidemia in the present study is 56%, which is slightly lower than that observed in Ganta V et al.'s study, with a prevalence of 65.7%. A similar study conducted by Rashmi et al.⁵, on 71 CKD patients showed elevated triglyceride levels with a mean value of 157.88±61.82 mg/dl. It was also noted that HDL was markedly decreased with a mean value of 33.40±9.06 mg/dl. Ganta v et al.⁶ reported increased triglyceride levels in patients undergoing HD compared to patients undergoing conservative management with mean values of 123.54±58.62 mg/dl and 103.97±52.33 mg/dl, respectively. HDL was also found to be decreased in both groups. In a study conducted by Raju et al.⁷, serum triglycerides were elevated in patients undergoing conservative management compared to patients undergoing HD with mean values of 209.80±32.43 mg/dl and 195.42±19.13 mg/dl, respectively. HDL was found to be decreased in both HD and conservatively managed groups with mean values of 29.97±3.93 mg/dl and 35.28±5.67 mg/dl, respectively. Maheshwari N et al.⁸, reported hypertriglyceridemia and low HDL and elevated lipoprotein-a contribute to atherosclerosis and cardiovascular disease that may increase the morbidity and mortality in patients on maintenance hemodialysis.

CONCLUSION

In this study, alteration in different lipoprotein fractions in chronic renal failure patients was studied, and also the difference in lipid profile in chronic renal failure patients on conservative treatment and hemodialysis was studied.

Predominant lipid abnormalities observed in the study were elevated triglycerides and reduced HDL cholesterol levels, which are the predictive indices for coronary artery disease in CKD patients.

Serum triglycerides and VLDL were found to be relatively higher, and HDL was somewhat lower in patients undergoing hemodialysis than those under conservative management.

Since the lipid abnormalities in chronic renal failure accelerate the progression of renal failure and predispose to atherosclerosis, it is worthwhile detecting and treating hyperlipidemia in chronic renal failure.

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