TO IDENTIFY THE LIPID PATTERN IN CHRONIC KIDNEY DISEASE PATIENTS

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ABSTRACT

Aim: The aim of the present study was to identify the lipid pattern in chronic kidney disease patients.

Methods: The study was conducted in the Department of Medicine, Government Medical College and Rajindra Hospital Patiala, India, multi-specialty, tertiary care teaching hospital. This study was done for duration of 1 year from the date of approval of plan. 100 patients of chronic kidney disease coming to the Department of Medicine, Government Medical College and Rajindra hospital was included in the study.

Results: In the present study, majority of patients, i.e. 38 (38%) belonged to the age group 45-54 years, followed by 25 patients (25%) in age group 55-64 years, 23 patients (23%) in age group 65-74 years and 14 patients (14%) in age group 35-44 years.51 patients (51%) were male and 49 patients (49%) were females. Mean value of serum Triglycerides was 161 mg/dl, serum total cholesterol was 201.5 mg/dl, serum HDL was 34.6 mg/dl, serum VLDL was 31.8 mg/dl and serum LDL was 134.7 mg/dl. The mean values of the different fractions were obtained with respect to the co-morbid conditions present in the study sample were not significant. The mean values of the different fractions were obtained in both diabetic and non-diabetic CKD patients were not significant. A similar comparison in the mean values of the lipid profile was done in

patients who were on dialysis and those who were being treated conservatively and it was found non-significant.

Conclusion: This study concluded that the mean values of the lipid profile in hundred CKD patients showed a borderline high range of serum triglycerides, serum total cholesterol and LDL, and decreased HDL. There was no statistically significant difference in lipid profile of male and female CKD patients.

Keyword: Chronic kidney disease, Dyslipidemia, Lipid profile

INTRODUCTION

Chronic Kidney disease (CKD) is a condition that causes damage to the kidney or its gradual impairment involving the loss of glomerular and tubular function that lasts longer than three months.[1,2] CKD has now emerged as a public health problem with a worldwide prevalence of around 8-16%.[3,4] The incidence of CKD in India, due to the lack of a nationalregistry, is not well defined. However, it has been estimated that the prevalence of CKD in India may be up to 785 people per million population.[5] CKD gradually progresses towards end-stage renal disease (ESRD), generally in association with high cardiovascular morbidity and mortality. In fact, CKD patients are more likely to die of cardiovascular complications than ESRD.[6]

Cardiovascular diseases are the leading causes of death in ESRD largely as the result of progressively increasing age of ESRD patients and the broad constellation of uremia-associated features. When the kidney function has deteriorated and is no longer adequate to sustain life, renal replacement therapy, dialysis, or transplantation becomes necessary to maintain life. Hence, it is important to prevent the development of chronic renal insufficiency and subsequent progression to ESRD.[7-10] Unfortunately, kidney disease in its early stages is generally asymptomatic. Early identification of patients at risk for CKD is essential. Major risk factors for the development and progression of CKD include type I diabetes, high blood pressure, protein barrier, family history ofkidney disease, and increasing age.

CKD remains a high risk for cardiovascular disease and end-stage renal failure. Awareness by the public and healthcare providers of its determinants and its prognostic significance can prevent or reduce the development of CKD. In addition, adequate glycemic and blood pressure control preferably with blockers of the Renin Angiotensin System are required therapeutic approaches. Acute kidney injury, a common complication of critically patients is associated with high mortality and, in survivals, with increased risk of CKD.[11] The spectrum of dyslipidemia in patients with CKD and dialysis patients is distinct from that of the general population. It involves all lipoprotein classes and shows considerable variations depending on the stage of CKD. There seems to be a gradual shift to the uremic lipid profile as kidney function deteriorates, which is further modified by concurrent illnesses such as diabetes and nephrotic syndrome.[12-15] Apart from quantitative differences, major qualitative changes in lipoproteins can be observed, such as oxidization and modification to small dense LDL (sdLDL), which render the particles more

atherogenic. Plasma triglycerides start to increase in early stages of CKD and show the highest concentrations in nephrotic syndrome and in dialysis patients, especially those who are treated with peritoneal dialysis (PD). Plasma triglycerides are predominantly found in two types of lipoproteins in normal individuals.

The aim of the present study was to identify the lipid pattern in chronic kidney disease patients.

MATERIALS AND METHODS

The study was conducted in the Department of Medicine, Government Medical College and Rajindra Hospital Patiala, India, multi-specialty, tertiary care teaching hospital. This study was done for duration of 1 year from the date of approval of plan. 100 patients of chronic kidney disease coming to the Department of Medicine, Government Medical College and Rajindra hospital was included in the study.

INCLUSION CRITERIA:

1.   Patients diagnosed as chronic kidney disease and are on conservative treatment or hemodialysis

2.   Age more than 15 years

3.   Male and female patients

EXCLUSION CRITERIA:

1.   Patients with liver disorders

2.   Family h/o hyperlipidemia

3.   Patients on lipid lowering drugs

4.   Patients with thyroid disorders.

5.   Renal transplant patients

Written consent was obtained from all the patients. History regarding symptoms and duration of the kidney disease, hypertension, diabetes, smoking, alcoholism, drug intake and treatment was elicited. A detailed clinical examination was performed in all patients including Height and Weight, Blood Pressure, renal function tests, abdominal ultrasonogram and Electrocardiogram was done for all patients. After 12 hours of overnight fasting blood sample was taken and following investigations will be performed in each patient:

1.   Haemogram (haemoglobin, total leukocyte count, differential leukocyte count, platelet count).

2.   Serum creatinine, blood urea

3.   Serum electrolytes

4.   Fasting lipid profile (total cholesterol, triglyceride, HDL, LDL, VLDL).

5.   T3, T4, TSH.

6.   Serum bilirubin, SGOT, SGPT.

7.   Fasting blood sugar.

8.   Electrocardiogram.

9.   Complete urine examination.

10.   USG whole abdomen and KUB Measurement of GFR

LIPID PROFILE ESTIMATION

a)   Serum total cholesterol was estimated by CHOP-PAP method as described by Allain (1974).[16]

b)   Serum Triglyceride will be estimated by GPO-trinder method as described by Trinder P Ann (1969).[17]

c)   Serum high density lipoprotein (HDL) was estimated by Phosphotungstic Acid Method as described by Brustein et al (1970).[18]

d)   Serum low density lipoprotein (LDL) was estimated by Friedwald- equation given by Friedwald (1974).[19]

e)   Serum very low-density lipoprotein (VLDL) was estimated by Friedwald- equation given by Friedwald (1974).[19]

Statistical Analysis

Collected data were analysed using statistical methods such as mean, median, standard deviation (SD) as per value. The results were displayed in tables with categorical variables presented as numbers and percentages and continuous variables presented as mean ± SD. Test applied: Independent sample t-test. (NS) indicates statistically non-significant i.e. $p > 0.05$ A p-value of < 0.05 is considered statistically significant.

RESULTS

Table 1: Distribution of patients

AGE (YEARS)	NO. OF PATIENTS	PERCENTAGE (%)
35-44	14	14%
45-54	38	38%
55-64	25	25%
65-74	23	23%
GENDER		
FEMALE	49	49.0
MALE	51	51.0
DIABETES MELLITUS		
Yes	45	45
No	55	55
HYPERTENSION		
Yes	63	63
No	37	37
HAEMODIALYSIS		
Yes	34	34
No	66	66
SMOKERS		
Yes	23	23
No	77	77
ALCOHOLICS		

Yes	16	16
No	84	84

In the present study, majority of patients, i.e. 38 (38%) belonged to the age group 45-54 years, followed by 25 patients (25%) in age group 55-64 years, 23 patients (23%) in age group 65-74 years and 14 patients (14%) in age group 35-44 years. The mean age of study participants was 54.74±9.42 years. The minimum age was 40 years and maximum age was 71 years. 51 patients (51%) were male and 49 patients (49%) were females. The male to female ratio was 1.04:1. It was found that CKD patients with diabetes comprised 45 percent of the study population while the remaining 55 percent were non diabetic. Among the hundred patients included in the study 63 percent (63patients) had hypertension as a comorbid condition, remaining 37 percent (37 patients) had no hypertension. In this study population only 34 percent (34 patients) were on hemodialysis while the remaining 66 percent (66 patients) were managed conservatively. 23 percent (23patients) were smokers, remaining 77 percent (77 patients) were non-smokers.16 percent (16 patients) were alcoholics and remaining 84 percent (84 patients) were non alcoholics.

Table 2: Fasting lipid profile in CKD patients

LIPID PROFILE	N	RANGE (mg/dl)	MINIMUM (mg/dl)	MAXIMUM (mg/dl)	MEAN (mg/dl)	STD. DEVIATION
TCC	100	160.00	135.00	295.00	201.5200	39.85795
TGL	100	240.00	73.00	313.00	161.0900	44.98644
LDL	100	164.00	67.00	231.00	134.7200	37.80013
VLDL	100	48.00	14.00	62.00	31.8700	8.95630
HDL	100	23.00	23.00	46.00	34.6000	5.26279

Mean value of serum Triglycerides was 161 mg/dl, serum total cholesterol was 201.5 mg/dl, serum HDL was 34.6 mg/dl, serum VLDL was 31.8 mg/dl and serum LDL was 134.7 mg/dl.

Table 3: Lipid profile in hypertensive and non-hypertensive CKD patients

LIPID PROFILE	HTN	NO. OF CASES	MEAN (mg/dl)	STD. DEVIATION	p-value
TCC	NO	37	194.9189	38.09592	0.206(NS)
	YES	63	205.3968	40.65414	
TGL	NO	37	154.4054	44.50934	0.257(NS)

	YES	63	165.0159	45.15403	
LDL	NO	37	129.2703	35.58999	0.271(NS)
	YES	63	137.9206	38.96082	
VLDL	NO	37	30.5135	8.87450	0.248(NS)
	YES	63	32.6667	8.97847	
HDL	NO	37	34.2703	4.26646	0.634(NS)
	YES	63	34.7937	5.79254	

The mean values of the different fractions were obtained with respect to the co-morbid conditions present in the study sample were not significant.

Table 4: Lipid profile in diabetic and non-diabetic CKD patients

LIPID PROFILE	DM	N	MEAN (mg/dl)	STD. DEVIATION	p-value
TCC	NO	55	206.3273	38.50688	0.184(NS)
	YES	45	195.6444	41.11578	
TGL	NO	55	169.7818	50.46146	0.132(NS)
	YES	45	150.4667	34.90806	
LDL	NO	55	138.6545	35.73732	0.252(NS)
	YES	45	129.9111	40.05611	
VLDL	NO	55	33.6182	10.02495	0.060(NS)
	YES	45	29.7333	6.97528	
HDL	NO	55	34.0364	4.89506	0.238(NS)
	YES	45	35.2889	5.65935	

The mean values of the different fractions were obtained in both diabetic and non-diabetic CKD patients were not significant.

Table 5: Lipid profile in CKD patients who were on haemodialysis as compared to those on conservative management

LIPID PROFILE	MANAGEMENT	N0. OF CASES	MEAN (mg/dl)	STD. DEVIATION	p-value
TCC	Conservative	66	205.6818	38.00695	0.147(NS)
	Hemodialysis	34	193.4412	42.64739	
TGL	Conservative	66	159.9242	42.15660	0.720(

	Hemodialysis	34	163.3529	50.62451	NS)
LDL	Conservative	66	138.5303	35.39762	0.161(NS)
	Hemodialysis	34	127.3235	41.63093	
VLDL	Conservative	66	31.6364	8.37879	0.718(NS)
	Hemodialysis	34	32.3235	10.10167	
HDL	Conservative	66	35.5152	5.53379	0.515(NS)
	Hemodialysis	34	32.8235	4.22454	

A similar comparison in the mean values of the lipid profile was done in patients who were on dialysis and those who were being treated conservatively and it was found non-significant.

Table 6: Lipid profile in male and female CKD patients

LIPID PROFILE	GENDER	NO. OF CASES	MEAN (mg/dl)	STD. DEVIATION	p-value
TCC	MALE	51	202.7843	35.27850	0.748(NS)
	FEMALE	49	200.2041	44.46018	
TGL	MALE	51	163.0392	44.18867	0.661(NS)
	FEMALE	49	159.0612	46.17151	
LDL	MALE	51	135.6667	33.83824	0.800(NS)
	FEMALE	49	133.7347	41.86077	
VLDL	MALE	51	32.2353	8.79906	0.680(NS)
	FEMALE	49	31.4898	9.19267	
HDL	MALE	51	34.9804	5.06553	0.464(NS)
	FEMALE	49	34.2041	5.48475	

The p value of S. Triglycerides is 0.661, S. Cholesterol is 0.748, S.HDL is 0.464 and S.LDL is 0.800, S. VLDL is 0.680 which is insignificant for all the fractions.

DISCUSSION

Chronic kidney disease (CKD) results when a disease process affects the structural or functional integrity of the kidneys. Chronic kidney failure is the result of CKD. Chronic renal disease features various abnormalities of lipid metabolism, which results in an exceedingly atherogenic profile. Although most striking lipid abnormalities are seen in nephrotic syndrome, hyperlipidemia characterizes renal disease of every cause.

In our study the mean value of total cholesterol is 201.52±39.85 mg/dl which is within borderline high range. The minimum value is 135 mg/dL and the maximum value is 295 mg/dL. Ahmad R et al conducted a study of lipid profile in chronic kidney disease patients and found the mean value of cholesterol in chronic kidney disease cases is 195.6±58.5 mg/dL which is within the desirable range but towards higher side.[20]Singh S et al conducted a study of lipid profile in chronic kidney disease patients and found the mean value of total cholesterol is 195.21± 24.64mg/dL which is within the desirable range.[21]

In our study the mean value of triglycerides is 161.09±44.98 mg/dL which is within borderline high range. The maximum value is 313 mg/dL and the minimum value is 73 mg/Dl. Ahmad R et al conducted a study of lipid profile in chronic kidney disease patients and found the mean value of triglycerides in chronic kidney disease cases is 170.23±101.9 which is within the borderline high range.[20]Shukla D et al conducted a study of lipid profile in patients with chronic kidney disease and found the mean value of triglycerides is 170 mg/dL which is within the borderline high range.[22]In our study the mean value of low density lipoprotein is 134±37.8 mg/dL which is within borderline range. The maximum value is 237 mg/dL and the minimum value is 67 mg/dL. Shukla D et al conducted a study of lipid profile in patients with chronic kidney disease and found the mean value of low-density lipoprotein is 89 mg/dL which is within the optimal range.[22]

In our study the mean value of high-density lipoprotein is 34.60±5.26 mg/dL, which is within low range. The maximum value is 46 mg/dL and the minimum value is 23 mg/Dl. Ahmad R et al conducted a study of lipid profile in chronic kidney disease patients and found the mean value of high density lipoprotein in chronic kidney disease cases is 38.52±9.04 mg/dl which is within the low range.[20]Patil S et al conducted a study to evaluate the lipid profile in patients with chronic kidney disease and found the mean value of high density lipoprotein is 39±18.5 mg/dL which is within the low range.[23]In our study the mean value of very low density lipoprotein is 31.87±8.95mg/dL the maximum value is 62 mg/dL and the minimum value is 14 mg/dL.Verma M conducted a study to analyze the pattern of lipid profile in patients of chronic kidney disease and found the mean value of very low density lipoprotein is 31.98±11.50 mg/dL which is within the normal range.[24]

Nand et al compared lipid profile in Diabetic and non-diabetic patients on hemodialysis and revealed that the total cholesterol triglyceride, LDL, VLDL insignificantly elevated in diabetic patients compare to non-diabetic However HDL In diabetic patients in comparison to non-diabetic was significantly decreased.[25]Nayak KC et al found that the lipid profile in diabetic and non-diabetic patients with chronic kidney disease had elevated Total cholesterol LDL VLDL. However, they found no statistically significant correlation between diabetic and non-diabetic patients.[26] Shukla et al and conducted a study off profile among chronic kidney disease patients. The lipoprotein fractions were also compared between those on hemodialysis and conservative management and non-statistically significant correlation was found. The p values of serum cholesterol was 0.91, serum triglycerides was 0.87, serum LDL was 0 .09 and serum HDL was 0.80 which is not significant.[22] Singh S et al conducted fasting lipid profile among CKD patients.

The fasting lipid profile between CKD patients without hemodialysis and with hemodialysis revealed that there was increase in TG, VLDL and decrease in HDL in patients with hemodialysis as compare to without hemodialysis and the changes were statistically significant. The difference in values of TC and LDL were not statistically significant in either group in their study.[21]

Patel S et al[23] conducted study of Lipid profile in chronic kidney disease patients and the mean values of triglyceride and VLDL in patients of CKD with hypertension were higher than patients of CKD without hypertension. HDL was reduced in patients of CKD with hypertension. The p value of triglyceride is 0.013, HDL is 0.008 and VLDL is 0.015 which are statistically significant. However, the p value of cholesterol is 0.400 and LDL is 0.95 which is insignificant89

The results of our study are consistent with Patel S et al, difference being significant increase in mean triglycerides and significant decrease in mean HDL in hypertensive patients in Patel et al.

CONCLUSION

This study concluded that the mean values of the lipid profile in hundred CKD patients showed a borderline high range of serum triglycerides, serum total cholesterol and LDL, and decreased HDL. There was no statistically significant difference in lipid profile of male and female CKD patients. Presence of Comorbid conditions like hypertension and diabetes does not alter lipid profile significantly. There was no statistically significant difference in lipid profile of CKD patients whether on hemodialysis or conservative management. Thus, hemodialysis has no significant role in management of dyslipidemia in CKD patients.

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