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ORIGINAL RESEARCH

STUDY THE CORRELATION IN DIFFERENT LIPOPROTEIN LEVELS WITH RESPECT TO SEVERITY OF CHRONIC KIDNEYDISEASE

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ABSTRACT

Background: The glomerular filtration rate (GFR) is widely accepted as the best overall measure of kidney function in health and disease. The stages are defined as the presence of structural or functional abnormalities of the kidney, initially without decreased GFR, which over time can lead to decreased GFR.**Objectives:**To study the correlation in different lipoprotein levels with respect to severity of chronic kidneydisease**.Materials and Methods:** A hospital based observational study was conducted in admittedpatients intheMedicinewardandICUunderMedicineDepartmentofourhospital.Study included 52 Non-diabetic CKD patients, Lipid profile was assessed in every patient using commercially available kits on fully automated analyser. **Results:**Raised triglycerides were seen in 25% cases of CKD stage III, 35.7% in stage IV and 70% in CKD stage V respectively (p-0.032). Raised LDL was seen in 53.6%cases of CKD stage III,64.3%instageIVand70% in CKD stage V respectively(p-0.61). Low HDL levels were seen in 21.4%cases of CKD stage III, 28.6%in stage IVand 80% in CKD stage V respectively($p<0.01$). Mean Total cholesterol and triglyceride levels were observed to be significantly increasing with progression in CKD.

Conclusion: A high degree of correlation was found between lipid parameters and disease progression, which is statistically significant for cholesterol, triglyceride and HDLlevels.

Keywords: Triglycerides, LDL, HDL, *Lipid Profile,Chronic kidney disease patients,*

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Introduction: Lipoprotein metabolism is significantly changed in patients with impaired renal function [1]. Lipid abnormalities were once thought to represent consequences of ESRD, however they can appear in the early stages of CKD [2]. Factors such as nephrotic range proteinuria, diabetes mellitus, genetic lipid metabolism disorders, and steroid intake can all affect the type of dyslipidemia [2]. The activity of lipoprotein lipase and hepatic triglyceride lipase is reduced in patients with CKD. This prevents the liver and peripheral tissue from absorbing triglyceride-rich, apolipoprotein B-containing lipoproteins, resulting in increased circulation of these atherogenic lipoproteins [3]. Disturbances in lipoprotein metabolism can be seen even in the early stages of CKD, and they usually progress in lockstep with the decline in renal function [4].

Hypertriglyceridemia, an increase in triglyceride remnant Lp (a), an increase in very-low-density lipoprotein (VLDL), a decrease in high-density lipoprotein (HDL), total cholesterol (TC), and low-density lipoprotein (LDL) are all abnormal lipid profiles in CKD patients, except in nephrotic syndrome patients [5].

It's important to look at the behavior of different lipid fractions in CKD patients. Research of the dyslipidemia risk posed by CKD in non-diabetic people was indicated in light of the limited literature available in the Indian population, thereby explaining the independent influence of CKD on dyslipidemia. This will aid in the development of a therapy regimen for the management of both obvious and eminent dyslipidemia in CKD patients.

Thus, the goal of the current investigation was to see if there was a link between different lipoprotein levels and the severity of chronic renal disease.

MATERIALS & METHODS

A prospective observational study was conducted in admitted non-diabetic CKD patients in the Medicine ward and ICU under Medicine Department of our hospital. Duration of study was 18 months. Study included 52 Non-diabetic chronic kidneydisease patients.

Sample Size Calculation:

Sample size formulae = $(Z\alpha/2)^2$ P* 1-P / D^2

Where;

Type 1 error $\alpha = 0.05$ ($Z\alpha/2 = 1.96$)
Prevalence of Dyslipidaemia in Non-Diabetic CKD is65%
Allowable difference20%
Power of test=80%Sample size= 51.7=52

Inclusion Criteria

1. Patients Diagnosed of CKD for a duration of more than 6 months.

2. Patients with CKD stage 3, 4 and 5 as per KIDGO classification.

3. Patients who have given consent for the study

Exclusion Criteria:

1. Patients below the age of 20 yrs.

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2. Patients with Diabetes Mellitus.

3. Patients with CKD stage 1 or 2

Detail medical history and relevant data and Informed consent was obtained from all subjects. All selected patients were inquired about detailed history regarding duration of CKD, treatment received for the same. Patients evaluated for serum level of total cholesterol, HDL, LDL and triglycerides

The stages of CKD were referenced from kidney disease improving global outcome (KDIGO) guidelines. **CKD** is defined as the presence, for at least 3 months, of evidence of kidney damage with an abnormal GFR or alternatively, by a GFR<60 ml/min/1.73m2 BSA [12]. GFR was calculated using

CKD-EPI equation:

GFR = 141x min (serum creat/Kappa,1) alpha x max (serum creat/Kappa,1) -1.209 x 0.993 age x sex x Race

Samples for lipid profile were collected after an overnight fast in a 5 ml syringe. After collection, the sample was allowed to clot for half hour and then the serum was analysed for lipid profile using commercially available kits on fully automated analyser in the biochemistry laboratory.

Statistical Analysis

Qualitative data was represented in the form of frequency and percentage. Association between qualitative variables was assessed by Chi-Square test. Quantitative data was represented using Mean ± SD. A p-value < 0.05 was taken as level of significance. SPSS Version 21.0 was used for most analysis.

RESULTS: Mean age of the CKD cases was 63.83years with over half(63.5%)of the cases were elderly i.e., above 60 years ofage. Equal gender distribution was observed among cases of CKD in present study (50% males and females). Most common aetiology of CKD in present study was hypertension (57.7%) followed by acute glomerulonephritis (26.9%) and interstitial nephritis (15.4%).

Table 1. Distribution of study cases as per aetiology

Aetiology	N	%
HT	30	57.7%
AGN	14	26.9

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		%
IN	8	15.4%
Total	52	100.0%

Out of the total 90 patients of CKD, 53.8% were in stage IIII while 26.9% and 19.2% were in stage IV and V respectively.

Amonglipidprofileparameters,raisedLDLwasthemostcommonderangementseen in CKD cases (59.6%) followed by low HDL (34.6%), raised Triglycerides and total cholesterol (36.5% and 34.6%respectively).

Raised cholesterol was seen in 14.3% cases of CKD stage III, 42.9% in stage IV and 80% in CKD stage V respectively (p<0.01).

Table 2. Association of CKD stage with total cholesterol

CKD Stage	**Total Cholesterol**		**Total**
	Normal	**Raised**	
III	24	4	28
	85.7%	14.3%	100.0%
IV	8	6	14
	5	4	1

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	7.1%	2.9%	00.0%
V	2	8	10
	20.0%	80.0%	100.0%
Total	34	18	52
	65.4%	34.6%	100.0%
p- value <0.01			

Raised triglycerides were seen in 25% cases of CKD stage III, 35.7% in stage IV and 70% in CKD stage V respectively (p-0.032).

Table 3. Association of CKD stage with triglycerides

CKD Stage	**Triglycerides**		**Total**
	Normal	**Raised**	
III	21	7	28
	75.0%	25.0%	100.0%
IV	9	5	14
	64.3%	35.7	100.0%

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		%	
V	3	7	10
	30.0%	70.0%	100.0%
Total	33	19	52
	63.5%	36.5%	100.0%
p- value - 0.032			

Raised LDL was seen in 53.6% cases of CKD stage III, 64.3% in stage IV and 70% in CKD stage V respectively (p-0.61).

Table 4. Association of CKD stage with LDL levels

CKD Stage	LDL		Total
	Normal	Raised	
III	13	15	28
	46.4%	53.6%	100.0%
IV	5	9	14
	35.7%	64.3%	100.0%

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V	3	7	10
	30.0%	70.0%	100.0%
Total	21	31	52
	40.4%	59.6%	100.0%
p- value - 0.61			

Low HDL levels were seen in 21.4% cases of CKD stage III, 28.6% in stage IV and 80% in CKD stage V respectively ($p<0.01$).

Table 5. Association of CKD stage with HDL levels

CKD Stage	**HDL**		**Total**
	Normal	**Low**	
III	22	6	28
	78.6%	21.4%	100.0%
IV	10	4	14

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	71.4%	28.6%	100.0%
V	2	8	10
	20.0%	80.0%	100.0%
Total	34	18	52
	65.4%	34.6%	100.0%
p- value <0.01			

DISCUSSION

The study population consist of 52 patients distributed adequately in term of age and sex. Average age of the CKD patients was 63.83 years, with over half (63.5%) of the cases being elderly (over 60 years old). In the current investigation, the gender distributionofCKDcaseswasfoundtobeequal(50% malesandfemales).The majority of patients (23%) in the Lahariya D et al. [6] study are between the ages of 51 and 60, with 56 percent males and 44 percent females. The Malyaban akis et al. [7] study included 155 chronic renal disease patients, 62.6 percent of them were men and the remaining 37.4% were women.

Hypertension was the most common cause of CKD in this study (57.7%), followed by acute glomerulonephritis (26.7%) and interstitial nephritis (26.7%), (15.4 %). Patil VC et al. [8] found that contributory co-morbidities such as hypertension were present in the majority of patients (51%). According to Behera BP et al.[9], hypertension was diagnosed in 32.82 percent of CKD cases.

The mean serum cholesterol concentration was 164.0447.85 mg/dl, with a range of 44 to 323 mg/dl. Hypercholesterolemia was found in 19.61 percent of the patients. The mean blood triglyceride concentration was 147.1669.40 mg/dl, with a range of 41 to 467 mg/dl. Hypertriglyceridemia was seen in 37.40 percent of the patients. The mean blood HDL concentration was 51.5016.72 mg/dl, with a range of 4 to 126 mg/dl. HDL levels were < 40 mg/dl in 21.37 percent of the research participants. The mean serum LDL

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concentration was 91.4131.24 mg/dl, with a range of 12 to 203 mg/dl. LDL levels were higher in 11.07 percent of the research participants. The frequency of dyslipidaemia in non-DM CKD sufferers was found to be 78.67 percent by Murmu AP al. [10].

Mean total cholesterol and triglyceride levels were found to be considerably higher as the stage of CKD progressed (p0.01), whereas mean HDL levels were found to be significantly lower as the stage of CKD progressed (p0.01). The lipid profile exhibited a high connection with GFR, according to Lahariya D et al. [6]. Triglycerides had the strongest association (r=-0.543, p=0.001). The level of triglycerides rises as GFR falls. Apart from that, total cholesterol (r=-0.275, p=0.001), LDL (r=-0.427, p=0.001), and VLDL (r=-0.476, p=0.001) all have a negative connection with GFR, although HDL (r=0.268, p=0.001) has a positive correlation, indicating that as GFR decreases, HDL levels decrease as well. Malyaban das et al. [7] also found that dyslipidemia increased with stage of chronic kidney disease, with 21.4 percent of stage 2 patients having abnormal lipid profiles, 62.2 percent of stage 4 patients having abnormal lipid profiles, and 75.6 percent of stage 5 patients having abnormal lipid profiles. The link between aberrant lipid profiles and chronic renal disease stage was discovered to be statistically significant (p value 0.001). When comparing dyslipidaemia to CKD staging, Murmu AP et al. [10] discovered that lipid abnormalities was 75 percent, 73 percent, and 81.7 percent in Stage III, IV, and V, respectively. In Stage V, the most common anomaly was decreased HDL, which was identified in 65.59 percent of patients. In the Stage III and Stage IV populations, HDL levels dropped by 50% and 48.64 percent, respectively. Increased TG levels were found to be 45 percent, 32.43 percent, and 60.21 percent in Stages III, IV, and V, respectively. In this study, there was no statistically significant (p=0.55) rise in LDL levels in association to increased CKD severity. Behera BP et al. [9] discovered a link between eGFR and lipid profile markers. HDL (r= 0.1962, p0.01) showed statistical significance when e-GFR was correlated with several parameters. With lowering e-GFR, there was a significant increase in total cholesterol, triglycerides, LDL, and a decrease in HDL.

CONCLUSION

It is concluded that in chronickidneydiseaselipid abnormalities accelerate progression of the kidney disease and have a high degree of connection, which is statistically significant for cholesterol, triglyceride, and HDL levels.

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DECLARATIONS

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Conflict of interest: None

Ethical approval: Ethical clearance was obtained from the institutional ethical committee for the present study.

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