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Dyslipidemia in Chronic Kidney Disease Correlation to Stages of Chronic Kidney Disease: An Evaluation in a Tertiary Care Hospital

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Abstract
Cardiovascular disease is a major cause of mortality in patients with mild to moderate kidney disease and end stage renal disease [ESRD]. The principal reason to evaluate Dyslipidemia in patients with chronic kidney disease is to detect abnormalities that may be treated to reduce the incidence of cardiovascular disease. Dyslipidemia has been established as a well known traditional risk factor for cardiovascular disease in the General Population and large scale observational studies have shown that patients with impaired renal function exhibit significant alterations in lipoprotein metabolism. Data was collected from patients attending the Department of General Medicine of Sree Mookambika Institute of Medical sciences, kanyakumari, Tamil nadu, from march 2023 to September 2024. inclusion criteria are All newly detected Non diabetic Chronic kidney disease from Sep 2022 to Sep 2023. Age Group 15-65 yrs. Impaired maturation of HDL in CKD is primarily due to down regulation of lecithin-cholesterol acyltransferase and to a lesser extent, increase plasma cholesteryl ester transfer protein. Trigylceride enrichment of HDL in CKD is due to hepatic lipase deficiency and elevated CETP activity. The lipid abnormalities are found to occur in all stages of chronic kidney disease. The Reduction in HDL is the most observed lipid abnormality. The lipid abnormalities started to occur even in the earlier stages of chronic kidney disease. However the severity of chronic kidney disease did not correlate with the severity of lipid abnormalities and it was found to be statistically in significant.

INTRODUCTION

Cardiovascular disease is a major cause of mortality in patients with mild to moderate kidney disease and end stage renal disease [ESRD]. The principal reason to evaluate Dyslipidemia in patients with chronic kidney disease is to detect abnormalities that may be treated to reduce the incidence of cardiovascular disease[1]. Since chronic Kidney disease is a progressive disease, the various lipid abnormalities vary from CKD stages 1-5. So it is prudent to look into various lipid abnormalities attributed to each stages of kidney disease[2-5]. In our hospital, there are many patients admitted last year fulfilling the criteria for chronic kidney disease and treated as inpatient or outpatient. At present the medical treatment for kidney disease is improving and patients long term survival is improving. Peritoneal dialysis, hemodialysis and transplantation have revolutioned the prognosis of chronic kidney disease in recent time. Although there is still controversy whether CKD represents an independent risk factor for incident cardiovascular disease, accumulating evidence over the last decade marks out cardiovascular disease as major cause of mortality in patients with mild to moderate CKD or ESRD. Dyslipidemia[6] has been established as a well known traditional risk factor for cardiovascular disease in the General Population and large scale observational studies have shown that patients with impaired renal function exhibit significant alterations in lipoprotein metabolism, which in their most advanced form may result in the development of severe Dyslipidemia. The Study mainly focuses on the lipid abnormalities attributed to different stages of chronic kidney disease.

Aims and Objectives of the Study:

- To analyze the lipid abnormalities in Patients with Non Diabetic Chronic Kidney Disease.
- To find the correlation in various stages of Chronic Kidney disease with Lipid abnormalities.
- To find which lipid abnormalities is more common in the study group.

MATERIALS AND METHODS

Data was collected from patients attending the Department of General Medicine of Sree Mookambika Institute of Medical sciences, kanyakumari, Tamil nadu, from march 2023 to September 2024. Inclusion criteria are All newly detected Non diabetic Chronic kidney disease from Sep 2022 to Sep 2023. Age Group 15-65 yrs, Elevated Renal Parameters with Urea: Creatinine ratio <20, Stable creatinine values taken 4 days apart with variation <20%, Ultrasonographic evidence of Chronic Kidney Disease with kidney size less or equal to 9cm. Exclusion criteria are Patients with known h/o diabetes mellitus and patients with Diabetic kidney disease, with elevated random blood sugar values of >200mg% were excluded, Ischemic heart disease on treatment already were excluded, Severe Comorbid conditions like pneumonia, alcoholic Liver disease and hypotension, Those who are taking Beta blocker and thiazide diuretics at time of study were excluded, Patients with H/o intake of anti cholestrelomic agents, H/O cigarette smoking, Patients with the features of hypothyroidism and obstructive Liver disease, Patients with previous H/o hemodialysis and peritoneal dialysis. Statistical analysis was done using the statistical package for social sciences (SPSS). Different statistical methods were used as appropriate. Mean±SD was determined for quantitative data and frequency for categorical variables. The independent t-test was performed on all continuous variables. The normal distribution data was checked before any t-test. The Chi-Square test was used to analyze group difference for categorical variables. In logistic regression models, age was adjusted for estimation of each or all the independent effects of hypertension, ischemic heart disease and diabetes mellitus. A p-value <0.05 was considered significant.

RESULTS AND DISCUSSIONS

The stage wise and sex wise relation of elevated TGL showed in the (table 1) reveals that there was no significant elevation was observed between the sexes (P>0.05) in all stages. The percentage elevated TGL is greatest in stage V group in the study. The analysis shown in the above (table 2) reveals that the mean LDL levels of male and female in IIIrd stage were 100.6±37.1 and 59+0 respectively. The difference was statistically highly significant (P<0.01). In other 2 stages the mean LDL values of male and female were statistically not significant (P>0.05). The mean HDL in stage III, IV, V patients are 39.2, 37.4, 39.8 respectively and their S.D. are 8.4, 7.4, 8.6 respectively. The mean TGL in stage III, IV, V patient are 130.1, 144.3, 149.8 respectively and their S.D. are 59.4, 58.9, 61.1 respectively. The mean LDL value in stage III, IV, V are 96.4, 112.5, 114.0 respectively and their S.D. are 37.4, 55.2 and 38.2. From this table, the HDL, TGL, LDL value

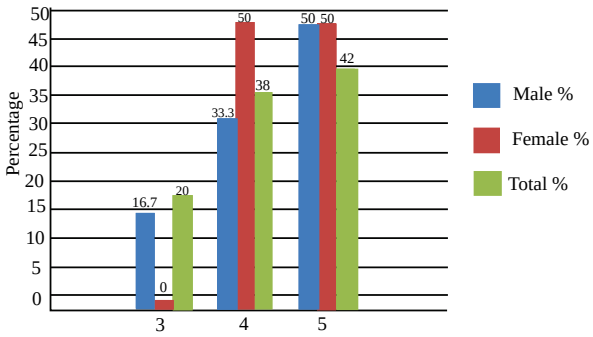

Fig. 1: Stage wise and Sexwise T.G.L. in%

in stages III, IV, V of CKD are not statistically significant (P>0.05) in variation. In other word, the inter group variability of various stages of lipid abnormality are not

Table 1: Stage Wise and Sex Wise Elevated TGL Classification of Study Subjects

Stages	Male		Female		Significance	Total	
	No	%	No	%		No	%
III	2	16.7	0	0	-	2	20.0
IV	4	33.3	3	50.0	P>0.05	7	38.0
V	6	50.0	3	50.0	-	9	42.0
Total	12	100.0	16	100.0	-	18	100.0

Table 2: Analysis and Assessment of Sex Wise and Stage Wise LDL Level in CKD Cases

Stage	Male			Female			Mean difference	't'	d.f.	Significance	Total	
	n	Mean	S.D	n	Mean	S.D					Mean	S.D.
III	9	100.6	37.1	1	59.0	0.0	41.6	3.363	8	P<0.01	96.4	37.4
IV	11	103.7	56.4	8	124.6	54.8	20.9	0.806	17	P>0.05	112.5	55.2
V	13	118.3	31.9	8	106.9	49.8	11.4	0.643	19	P>0.05	114.0	38.9
Total	33	108.6	42.2	17	112.4	51.7	3.8	0.280	48	P>0.05	109.9	45.2

Table 3: Stage Wise Comparison of Lipid Abnormalities

Lipids	Stage III n=10		Stage IV n=19		Stage V n=21		Anova F	Significant
	Mean	S.D	Mean	S.D	Mean	S.D		
HDL	39.2	8.4	37.4	7.4	39.8	8.6	0.464	P>0.05
TGL	130.1	59.4	144.3	58.9	149.8	61.1	0.369	P>0.05
LDL	96.4	37.4	112.5	55.2	114.0	38.9	0.553	P>0.05

Table 4: Stage wise Percentage Distribution of Alteration in Lipid Profile

Lipid	Stage III		Stage IV		Stage V		Total	
	No	%	No	%	No	%	No	%
↓HDL n=50	6	12.0	15	30.0	14	28.0	35	70.0
↑TGL n=50	2	4.0	7	14.0	9	18.0	18	36.0
↑LDL n=50	2	4.0	7	14.0	8	16.0	17	34.0

statistically significant. The above table shows the stage wise lipid profile alterations. The study group comprising HDL found in 6 (12%) in stage III, 15 (30%) in stage IV and 14 (28.0%) in stage V CKD. The study group comprising TGL found in 2 (4.0%) in stage III, 7 (14%) in stage IV, 9 (18%) in stage V CKD. The increase in LDL in study group found in 2 (40%) in stage III, 7 (14.0%) in stage IV, 8(16.0%) in stage V CKD. In HDL was found in 70% of all stages of CKD study group. 36% pts in all stage of CKD study group have increase in TGL. 34% Pts of all stages of CKD study group have increase in LDL. From this study the lipid profile alteration between the stages in term of percentages were statistically not significant (P>0.05). The atherogenic-lipid abnormalities in chronic kidney disease patients were elevated LDL, elevated triglycerides and low HDL. Impaired maturation of HDL in CKD is primarily due to down regulation of lecithin-cholesterol acyltransferase and to a lesser extent, increase plasma cholesteryl ester transfer protein. Trigylceride enrichment of HDL in CKD is due to hepatic lipase deficiency and elevated CETP activity[7-11]. The CKD induced Hypertriglyceridemia, abnormal composition, impaired clearance of TGL-rich lipoprotein due to down regulation of lipoprotein lipase, hepatic acyl-COA cholesterol acytransferase[14]. The apoprotein present predominantly in LDL and TGL are apo B100. The apoprotein present predominantly in the HDL are apo A-1, which is protective to the atherogenic event. The apo B48, present predominantly in the chylomicrons are not much atherogenic. LDL cholesterol-C contains much more apo B 100 level, which is atherogenic, when this LDL is associated with the high TGL level the incidence of atherogenesis is significantly elevated. Multiple lipid abnormalities are more atherogenic[12,13]. The study reference was taken from study conducted in Department of Nephrology, University of Medicine, Lublin. They analyzed the lipoprotein profiles at various stages of chronic kidney disease[14-19]. They have done in 502 pts who are not dialyzed prior. Their study period was 24mths. According to their study, the significant increase of TG, TC, LDL and ↓HDL were significantly increased in early stages of kidney disease and in end stage kidney disease there is not much alteration in lipid profile. This is attributed to malnutrition in ESRD in that study. We have taken the ATP III guidelines and the above standard study as our reference we had undergone the study and analyzed the results. We had taken the study population from the low socio economic status group. After satisfying the inclusion and exclusion criteria we analyzed the lipid abnormalities in all stages of chronic kidney disease, since[20]. We have no study group fits into stage I and II kidney disease, we analyze the other 3 stages of CKD. The decrease in HDL was found to be present in stage III, IV and V stages of CKD amounting to 70% of total[21]. The decrease in HDL observed in 3 group (mean 39.2, 37.4, 39.8) respectively are not statistically significant in severity when compared with stages (P>0.05). Similarly rise in TGL observed in III IV and V stage of CKD having mean value (130.1, 144.3 149.8) respectively are not statistically significant in

severity when compared with stages (P>0.05). The ↑in TGL in all stages of CKD amounting to 36% total. The rise in LDL obtained in III, IV and Vth stages of CKD having mean value (96.4, 112.5, 114.0) respectively, on comparison are not statistically significant (P>0.05). Though we found lipid abnormalities in form of ↑TGL, ↑LDL and ↓HDL in study group in all stage of CKD, This alteration is not statistically significant in severity on comparison by using this statistical package (S.P.S.S) in form of paired 't' test and anova test[22,23]. The probable reason offered would be a state of malnutrition in low social economic status group. However large sample size and long duration of study would throw more light upon.

CONCLUSION

The study Dyslipidemia in CKD-Correlation to stages of CKD An evaluation which was conducted in 50 patients in Medical wards of mookambika Medical college Hospital on Non-diabetes kidney disease people has revealed that. The lipid abnormalities are found to occur in all stages of chronic kidney disease. The Reduction in HDL is the most observed lipid abnormality. The lipid abnormalities started to occur even in the earlier stages of chronic kidney disease. However the severity of chronic kidney disease did not correlate with the severity of lipid abnormalities and it was found to be statistically in significant.

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