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Research Article

STUDY OF LIPID PROFILE IN PATIENTS OF NON DIABETIC CHRONIC KIDNEY DISEASE

Malyaban das[1]., Prajit mazumdar[2]., Vidyapati[3] and Garima Sachdeva[4]

[1,2,3]Department of Medicine, Rajendra Institute of Medical Sciences, Ranchi
[4]Department of Obstetrics and Gynaecology, Post Graduate Institute of Medical Research and Education (P.G.I.M.E.R)

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A B S T R A C T

Background: Our study focused on finding an approximate prevalence of dyslipidemia in the target reference population of patients of chronic kidney disease and the association dyslipidemia with staging of chronic kidney diseaae and association dyslipidemia with haemodialysis

Methods: We did a a cross sectional descriptive study conducted on 155 patients admitted with a diagnosis of chronic kidney disease in the department of medicine and dialysis unit of Rajendra Institute of medical sciences. Patients were diagmosed as chronic kidney disease with history and physical examination suggestive of chronic kidney disease along with biochemical evidence and radiological evidence of chronic kidney disease and patiens of diabetes mellitus, patients taking statin therapy for previously diagnosed dyslipidemia and patients having body mass index more than 24.9kg were however excluded.

Results: When comparing prevalence of dyslipidemia with haemodiaysis it was seen abnormal lipid profile was seen more in patients undergoining haemodialysis (77.7%) undergining haemodialysis as compared to conservative treatment group. It was also seen that dyslipidemia increased with increase in stage of chronic kidney disease- as 21.4% of patients of stage 2 had abnormal lipid profile as compared to 62.2% patients of stage 4 and 75.6% patients of stage 5 had abnormal lipid profile

Conclusion: We can conclude from our study that dyslipidemia in chronic kidney disease is high enough to pose a health problem as it increases the chances of cardiovascular disease and leads to increase mortality. The problem of dyslipidemia increases as the stage of chronic kidney disease increases and are seen more in patients of chronic kidney disease who are undergoining dialysis as compared to the conservative treatment group

INTRODUCTION

Chronic kidney disease is a global health problem. Prevalence of chronic kidney disease affects around 19 million Americans and there has been increase of chronic kidney patients by 30% over the last decade[1]. It is well documented that cardiovascular diseases is the most common causes of morbidity and mortality in patients of chronic kidney disease[2]. In patients with end stage renal disease and patients who require dialysis the cardiovascular mortality is 10-30 times higher than person of same age, race, sex and prevalence of coronary artery disease is 40%[3]. The mortatlity due to cardiovascular causes in patients undergoining dialysis is reported to be 9% annually. Hence, most patients of chronic kidney disease die of cardiovascular diseases even before they develop end stage renal disease[4].

Dyslipidemia is one of the most important notable factor among all traditional risk factors for cardiovascular diseases. Recent studies show that in patients of chronic kidney disease dyslipidemias play a important role in pathogenesis of cardiovascular disease as well as for detoriation of renal function[5]. Studies have shown positive correlation between cholesterol values and risks for cardiovascular events in patients of chronic kidney disease. Abnormalities in lipid profile is evident very early in course of chronic kidney disease and follows a rapid downhill course thereafter that parallels the detoriation in renal function.

With the implications of abnormal lipid profile in the pathogenesis of atherosclerosis and cardiovascular diseases, the present study was done to see the abnormalities of various lipid fractions in patients of chronic disease and to see the difference in abnormalities of lipid in patients of chronic kidney disease who underwent dialysis as compared to those who were treated conservatively. Moreover, data regarding abnormalities of lipid profile in chronic kidney disease patients in the Indian population is lacking as compared to data from western population.

Corresponding author:* **Malyaban das
Department of Medicine, Rajendra Institute of Medical Sciences, Ranchi

MATERIALS AND METHODS

Site of study-Ours is a cross sectional descriptive study conducted on the patients admitted with a diagnosis of chronic kidney disease in the department of medicine and dialysis unit of Rajendra Institute of medical sciences, Ranchi between January 2018 to April 2018

Study population-Patients who met the inclusion criteria were selected randomly and no distinction was made between males and females.

Inclusion criteria

1. Person with history and physical examination suggestive of chronic kidney disease along with biochemical evidence and radiological evidence of chronic kidney disease. Biochemical evidence of chronic kidney disease included raised urea and creatinine, presence of proteinuria on urine examination and reduced Gfr based of MDRD formula for a duration greater than 3 months. Ultrasonographic evidence of chronic kidney disease included bilateral shrunken kidney or loss of corticomedllary differentiation based on report of expert radiologist.
2. Patients who gave consent for enrolling in the study

Excusion criteria

1. Patient who were diagnosed cases of diabetes mellitus, ischemic heart disease
2. Patient taking statin therapy for previously diagnosed dyslipidemia
3. patients having body mass index more than 24.9kg/m^2
4. patients of acute renal failure

Samples for lipid profile were collected after a 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 laborotary.

Dyslipidemia was defined as
Statistical methods-

Observation

Our study population consisted of 155 patients of chronic kidney disease with 97 males (62.6 %) males and rest 37.4% females (Table 1)

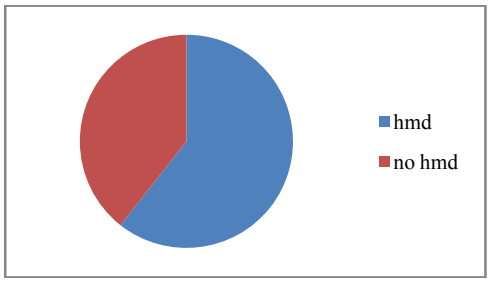
SEX distribution (Table 1)

		Frequency	Percent	Valid Percent
Valid	male	97	62.6	62.6
	female	58	37.4	37.4
	Total	155	100.0	100.0

Out of 155 patients-94 patients (60.6%) patients underwent haemodialysis and rest treated conservatively (Table 2 and figure 2)

Haemodialysis vs conservative treatment table 2

		Frequency	Percent	Valid Percent
Valid	yes	94	60.6	60.6
	no	61	39.4	39.4
	Total	155	100.0	100.0

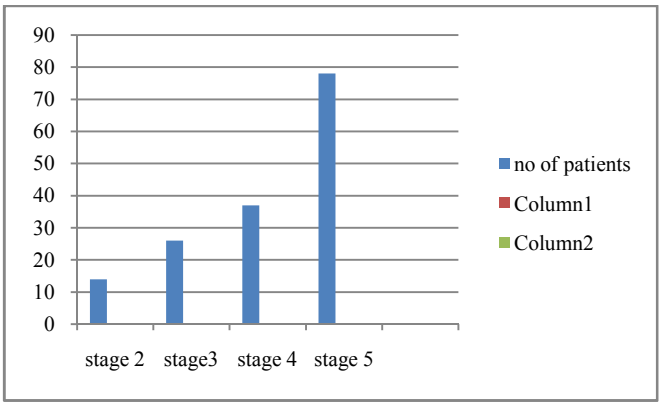


Haemodialysis vs conservative treatment **figure 2**

Patients were divided into 5 stages based on glomerular filtration rate. Majority of patients were in stage 5 (50.3%) and stage 4 (23.9%)…(Table 3 and figure 3)

Staging of chronic kidney disease (Table 3)

		Frequency	Percent	Valid Percent
Valid	2.00	14	9.0	9.0
	3.00	26	16.8	16.8
	4.00	37	23.9	23.9
	5.00	78	50.3	50.3
	Total	155	100.0	100.0

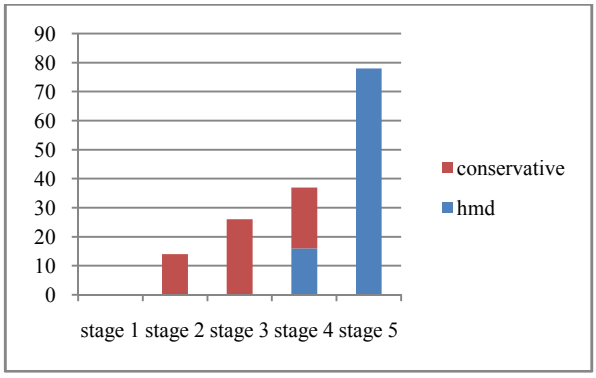


Staging of chronic kidney disease **figure 3**

Out of total 155 patients, 94 patients underwent haemodialysis and remaining were given conservative treatment. Majority of patients undergoining dialysis were in stage 5(83 %) and remaining in stage 4(17%). No patient in stage 2 and stage 3 underwent haemodialysis (Table 4 and figure 4)

Haemodialysis in different stage of ckd Table 4

HMD		Frequency	Percent	Valid Percent
yes	Valid 4.00	16	17.0	17.0
	Valid 5.00	78	83.0	83.0
	Total	94	100.0	100.0
no	Valid 2.00	14	23.0	23.0
	Valid 3.00	26	42.6	42.6
	Valid 4.00	21	34.4	34.4
	Total	61	100.0	100.0



Haemodialysis in different stage of ckd figure 4

In our study population abnormal lipid profile was seen in 95 patients (61.3%) out of total 155 patients.

Raised total cholesterol was seen in 32.9% of patients (Table 5) and hyper triglyceridemia was seen in 53.5% (Table 6) of patients whereas 23.2% had low HDL (Table 7)

Total_cholesterol (Tabe 5)

		Frequency	Percent
Valid	normal cholestrol	104	67.1
	raised total cholesterol	51	32.9
	Total	155	100.0

TRIGLYCERIDE (Table 6)

		Frequency	Percent
Valid	normal triglycerides	72	46.5
	raised triglycerides	83	53.5
	Total	155	100.0

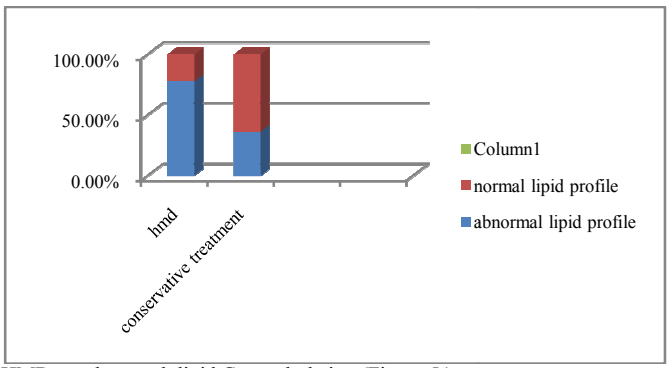
HDL (Table 7)

		Frequency	Percent
Valid	normal hdl	119	76.8
	low hdl	36	23.2
	Total	155	100.0

When comparing prevalence of dyslipidemia with haemodiaysis it was seen abnormal lipid profile was seen more in patients undergoining haemodialysis (77.7% of patients undergining haemodialysis) and this association was statistically significant (p-value <.001) -Table 8 and figure 5

HMD vs abnormal_lipid Crosstabulation (Table 8)

			abnormal_lipid		Total
			normal	abnormal	
HMD	yes	Count	21	73	94
		% within HMD	22.3%	77.7%	100.0%
	no	Count	39	22	61
		% within HMD	63.9%	36.1%	100.0%
Total		Count	60	95	155
		% within HMD	38.7%	61.3%	100.0%

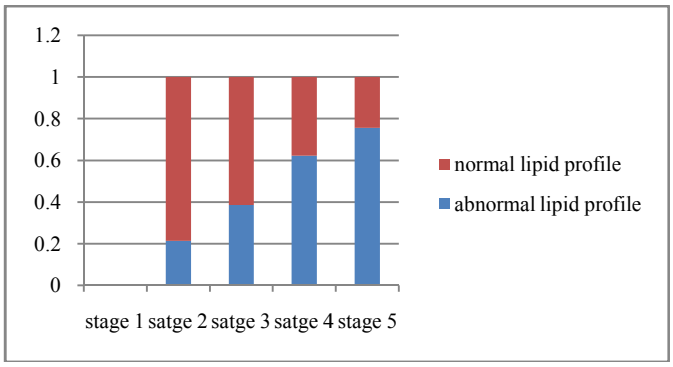


HMD vs abnormal_lipid Crosstabulation (Figure 5)

It was also seen that dyslipidemia increased with increase in stage of chronic kidney disease- as 21.4% of patients of stage 2 had abnormal lipid profile but 62.2% patients of stage 4 and 75.6% patients of stage 5 had abnormal lipid profile. The association of abnormal lipid profile with stage of chronic kidney disease was found to be statistically significant (p value < .001)-Table 9 and figure 6

staging vs abnormal_lipid Crosstabulation (Table 9)

			abnormal_lipid		Total
			normal	abnormal	
staging	2.00	Count	11	3	14
		% within staging	78.6%	21.4%	100.0%
	3.00	Count	16	10	26
		% within staging	61.5%	38.5%	100.0%
	4.00	Count	14	23	37
		% within staging	37.8%	62.2%	100.0%
	5.00	Count	19	59	78
		% within staging	24.4%	75.6%	100.0%
Total		Count	60	95	155
		% within staging	38.7%	61.3%	100.0%



Staging vs abnormal_lipid Crosstabulation (Figure 6)

DISCUSSION

The study population consisted of 155 patients distributed adequately in terms of age and sex.

In the study conducted, there was 97 males and 58 females. The prevalence of dyslipidemia in the study was 61.3% (95 patient out of 155 patients) had dyslipidemia. The dyslipidemia included raised total triglycerides and total cholesterol and reduced HDL.

The reason for hyper triglyceridemia seemed to be reduced catabolism of triglycerides due to deficiency of lipoprotein lipase and hepatic triglyceride lipase or both as was evident from kinetic studies in patients of chronic kidney disease after lipid administration. Possible reasons for deficiency of lipoprotein lipase in patients of chronic kidney disease are increase in lipoprotein lipase inhibitors like apo c3 and decrease in lipoprotein lipase activators like apo c 2 leading to less catabolism of triglycerides[6,7,8]. Another mechanism is hyperparathyroidism which also leads to reduced catabolism of triglyceride rich lipoproteins[9,10]. Moreover, insulin resistance seen in patients of end stage renal disease leads to increased hepatic production of trilglyceride rich lipoproteins.

The reduced HDL is explained by the fact that in patients of chronic kidney disease there is reduction in apo a1 and apo a 3 (the main constituents of HDL) and there is also reduction of LCAT (enzyme responsible for esterification of free cholesterol into HDL) along with increased CETP (enzyme responsible for transfer of cholesterol esters from HDL to triglyceride rich lipoproteins)[11,12,13].

A study from Nepal showed higher percentage of dyslipidemia in the chronic kidney disease group as compared to non chronic kidney disease group and it was similar to results in our study[14]. Similar results were seen in a study conducted by Saroj K *et al* where they found 36.6% of patients of chronic kidney disease had dyslipidemia[15] as compared to our study where 61.3% patients had abnormal lipid profile.

Our study showed patient had 53.5% hyper triglyceridemia, 32.9% patients had hyper cholesteremia and 23.2% patients had low HDL.

Anderson *et al* found raised total cholesterol in only 20% of the cases of chronic kidney disease [16] whereas in a study conducted in Nepal by Poudel B hypercholesteremia was seen in 33.7% of the total cases [14].

In our study, it was seen that total 94 patients underwent dialysis out of total 155. Out of 94 patients undergoining dialysis 73 patients (77.7%) had dyslipidemia which was far

more as compared to the conservative treatment group (36.1%) and it was statistically significant. Similar findings of increased dyslipidemia in the dialysis group as compared to the conservatively treated group was seen by Kronberg F *et al*[17].

Possible reasons for more dyslipidemia in patients undergoining dialysis are that majority of patients undergoing haemodialysis were in stage 5 which indirectly indicate that majority of patients undergoing haemodialysis were suffering from chronic kidney disease for a long time. Moreover in patients of haemodialysis, the repeated use of heparin leads to reduced catabolism of triglyceride rich lipoproteins because heparin leads to release of lipoprotein lipase from the endothelial surface, hence chronic administration of heparin leads to lipoprotein lipase deficiency and ultimately leads to reduced catabolism of triglycerides[18]. In our patients, acetate was used as dialysate during hemodialysis, so the low HDL seen in our patients undergoing haemodialysis can be due to the use of acetate dialysate as compared to bicarbonate dialysate as explained in previous studies[19].

Another possible explanation in patient who undergo CAPD (Continuous ambulatory peritoneal dialysis) is that significant amount of glucose is absorbed from the dialysis fluid, ultimately leading to more insulin secretion and more hepatic production of triglyceride rich lipoproteins.

It was also seen that dyslipidemia increased with progression of the stage of chronic kidney disease as 21.4% patients had dyslipidemia in stage 2 of chronic kidney disease, 38.5% patients had dyslipidemia in stage 3, 62.2% patients had dyslipidemia in stage 4 and 75.6% patients had abnormal lipid profile in stage 5. The possible explanation of more patients with abnormal lipid profile in stage 4 and stage 5 as compared to other stages was that most patient in stage 5 were undergoining dialysis and were suffering from chronic kidney disease for a long duration. Moreover, it has been seen had dyslipidemias develop early in course of chronic kidney disease but progress rapidly as the stage of chronic kidney disease increases[20], thereby explaining our observation that abnormal lipid profile is seen more in stage 5 chronic kidney disease patients.

CONCLUSION

We can conclude from our study that dyslipidemia in chronic kidney disease is high enough to pose a health problem as it increases the chances of cardiovascular disease and leads to increase mortality. The problem of dyslipidemia increases as the stage of chronic kidney disease increases for reasons explained above and lipid profile derrangements are seen more in patients of chronic kidney disease who are undergoining dialysis as compared to the conservative treatment group. Hence careful and frequent monitoring of lipid profile should be done in patients of chronic kidney disease to reduce morbidity and mortality and also to improve quality of life.

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