Original article

Lipid profile in non-diabetic chronic kidney disease

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Abstract

Objective : The objective of the study was to evaluate the lipid profile in non-diabetic patients with chronic kidney disease because dyslipidaemia is one of the cardiovascular risk factors responsible for cardiovascular disease and rapid progression of chronic kidney disease (CKD) to end stage renal disease.

Methods : This cross-sectional descriptive study was carried out in the department of Biochemistry, Chittagong Medical College and the samples were collected from the department of Nephrology, Chittagong Medical College Hospital during the period of July 2013 to June 2014. We enrolled 50 patients of both sexes suffering from chronic kidney disease without any cardiovascular instability and renal replacement therapy. For diagnosis of CKD, history and clinical features with supportive biochemical and radiological evidence were taken as criteria. Patients with already known diabetes mellitus were excluded.

Results : This study shows mean age was 60.12 (SEM±1.75) years. Among the 50 participants 58% were male and 42% were female. It was observed that the prevalence of dyslipidemia in CKD was found to be about 65.%. And the prevalence was increasing with the increase in severity of the disease. This abnormality was followed by a fall in HDL cholesterol and rise in the total Serum cholesterol in patients suffering from CKD.

Conclusions : The high prevalence of lipid abnormalities in CKD may accelerate the progression of CVD and increase the mortality of patients. Hence it is worthwhile to test and detect patients at high risk early on and manage accordingly.

Key Words : Dyslipidaemia, Non- diabetic CKD, End stage renal disease.

Introduction

Chronic Kidney Disease (CKD) is a worldwide health problem. Prevalence of CKD in the United States is increasing and affects about 19 million Americans.1 The United States has seen a 30% increase in patients suffering from CKD in the last decade.2 Over the last decade, it was established that CKD is associated with a very high mortality rate and accelerated Cardio-Vascular disease(CVD)[3].

Recent studies suggest that the risk for death is increased in individuals with less severe impairment of kidney function that does not require dialysis when compared to those who have preserved kidney function.

In patients who finally advance to end stage disease (ESRD) and especially dialysis patients, the prevalence of clinical coronary heart disease is 40% and CVD mortality is 10 to 30 times higher than in the general population of the same gender, age and race[3,4].

Dyslipidemia may be worsened by dialysis, especially continuous ambulatory peritoneal dialysis (CAPD). Dyslipidemia among patients with heart disease (HD) negatively impacts cardiovascular profiles, which in turn influence the frequency and/or duration of hospitalizations.5 Patients on CAPD exhibit high levels of total cholesterol (TC) and low density lipoprotein (LDL).6 After CAPD treatment for more than 12 months, these patients may reveal higher serum triglyceride and total serum cholesterol levels compared to their values before commencing CAPD. This phenomenon is not observed in HD patients, and it should be considered when selecting a dialysis modality given the risk of (CVD) in the dialysis population.7 In addition, a cross-sectional study found that variable results of lipid levels are related to their duration on dialysis8. The present study is mainly aimed at knowing the overall prevalence of dyslipidemia in hospitalized CKD patients and asses the derangement in lipid profile based on the severity of CKD.

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Materials & method

This cross-sectional descriptive study was carried out in the department of Biochemistry, Chittagong Medical College during the period of July 2013 to June 2014. Fifty patients of both sexes suffering from chronic kidney disease without any cardiovascular instability and renal replacement therapy were enrolled. Blood samples were collected from the admitted patients of Nephrology department, Chittagong Medical College Hospital and biochemical tests were done in the department of Biochemistry, Chittagong Medical College. Data were analyzed the by computer based software SPSS for windows version 18. Data were expressed as mean ±SEM. Confidence level was fixed at 95% and P value of 0.05 or less was considered significant.

Results and observations

Table-1: Distribution of age among the study groups

Age in years	Frequency	Percentage	Mean±SEM
40-50	5	10.0	
51-60	23	46.0	60.12±1.75
>60	22	44.0	

Table-2 : Distribution of sex among the study groups

Sex	Frequency	Percentage
Male	29	58.0
Female	21	42.0
Total	50	100.0

Table–3 : Distribution of serum creatinine and uric acid level (mg/dl) among the study groups (n=50)

(mg/dl)	N	Mean	± SEM
Serum creatinine	50	2.7	2.96
Serum Uric Acid	50	7.59	1.60

Table - 4 : Distribution of CKD stages among the study groups (n=50)

	Frequency	Percentage
CKD Stage 3	9	18
CKD Stage 4	14	28
CKD Stage 5	27	54

Table- 5 : Prevalence of dyslipidemia among the study groups

Dyslipidemia	Frequency	Percentage
Yes	32	64
No	18	36

Table-6 : Mean distribution of lipid profile among the study groups

Lipid profile	Mean	± SEM
Serum Total Cholesterol (mg/dl)	154.74	73.05
Serum LDL Cholesterol (mg/dl)	98.36	27.63
Serum HDL Cholesterol (mg/dl)	39.96	5.34
Serum TG (mg/dl)	162.16	51.88

Discussion

Chronic kidney disease (CKD) is one of the common health problems in the world and more common in developing countries like Bangladesh. The study consisted of 50 patients of which after evaluation represented the study population adequately in terms of age and sex. The mean age of the population of the study was 60.12±1.75 years.

It has been observed that the representation of either sex is adequate in the study group with a total of 29 (58%) patients being male and 21 (42%) patients being female.

The prevalence of dyslipidemia in non-diabetic CKD as calculated in this study is found to be 64% in patients with CKD without any prior history of diabetes. A study among Nepalese population with CKD recorded a higher prevalence of dyslipidemia among CKD patients when compared to the non-CKD control group, and the difference was statistically significant[9].

In the general study population there is marked elevation of triglycerides in 24 (48%) patients. A study by Saroj K et al reported a prevalence of 36.6% and a study in Khatmandu, Nepal also showed a prevalence of 35.58% of hypertriglyceridemia in CKD[9,10].

The cause for hyper triglyceridemia in chronic kidney disease patients has not been delineated. Available data derived from kinetic studies with intralipid administration have demonstrated that in the reduced catabolism of triglycerides, the predominant defect may be due to deficiency of lipoprotein lipase or hepatic triglyceride lipase or both.

Hypercholesteremia was found in 12 (24%) patients and decrease in HDL cholesterol was found in 16 (32%). Saroj K et al found about 34.4% of the CKD study patients to have hypercholesteremia and 34.1% had low levels of HDL cholesterol.10 The reports conducted in Khatmandu, Nepal by Poudel B et al showed a prevalence of 33.75% of hypercholesteremia[9]. Anderson et al found hypercholesteremia in 20% of the patients in there study[11].

Hypercholesteremia is a significant risk factor for CAD. But, Gerald Appel found low values of cholesterol in CKD patients[12]. Goldberg et al found decrease in HDL concentrations in CKD patients as compared to controls in contrast to Rapoport and Aviram study showed no decrease in HDL concentrations in CKD patients[13,14].

The LDL cholesterol is abnormal is only observed in 11 (22%) of the study population whereas Saroj K et al reported a larger figure of 35% of the study population to have undesirable LDL levels and Poudel et al reported an even higher prevalence of 38.03%. But abnormality in uremia is mainly qualitative[9,10].

In the present study 9 patients (18%) were in stage 3, 14 (28%) patients belonged to stage 4 and 27 (54%) patients were categorized as stage 5 or end stage renal disease. The prevalence of dyslipidemia increases as the chronic kidney disease progresses. According to Vaziri and Moradi CKD causes profound dysregulation of lipoprotein metabolism, resulting in lipoprotein abnormalities. Dyslipidemias develop during early stages of CKD, but progress rapidly with progression of CKD[15].

There is also increased incidence of dyslipidemia in stage 5 CKD as most of the patients undergo regular haemodialysis. And this increased incidence of dyslipidemia in stage 5 CKD may also be due to the long duration of illness. This has to be confirmed by further studies. No cases have been excluded from the study after enrolling due to complications or death during the study.

Conclusion

The study concludes that, the prevalence of dyslipidemia in non-diabetic CKD is high enough to create a health problem in the society and this problem of dyslipidemia increases with the severity of CKD. A high degree of abnormality is found in triglycerides in the form of hypertriglyceridemia in non-diabetic CKD patients.

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