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Assessment of lipid profile in CKD patients

PV Satyanarayana[1], T Moin Sabeen[2]

[1]Associate Professor, Kurnool Medical College, Kurnool, India.
[2]Assistant Professor, Khaja Bhanda Nawaz Institute of Medical Sciences, India.

Abstract

Background: To assess lipid profile in CKD patients. **Methodology:** Seventy CKD patients of both genders were selected. Group I had CKD patients and group II had equal age and gender matched healthy subjects. All were subjected to ultrasonography (USG). Assessment of blood urea, serum creatinine, lipid profile such as total cholesterol, triglycerides, HDLc, LDLc, VLDLc were done with semi-autoanalyzer. **Results:** There were 20 males and 15 females in group I and 18 males and 17 females in group II. The mean total cholesterol was 132.4 mg/dl in group I and 147.6 mg/dl in group II. TG was 150.6 mg/dl in group I and 96.8 mg/dl in group II. HDLc was 32.2 mg/dl in group I and 44.1 mg/dl in group II. LDLc was 64.1 mg/dl in group I and 76.2 mg/dl in group II. VLDLc was 32.4 mg/dl in group I and 18.6 mg/dl in group II. The difference was significant (P< 0.05). The mean blood urea was 126.1 mg/dl in group I and 30.4 mg/dl in group II. The mean serum creatinine was 6.4 mg/dl in group I and 0.98 mg/dl in group II. The difference was significant (P< 0.05). **Conclusion:** There was increased triglycerides, increased VLDL and reduced HDL in CKD patients leading to increased cardiovascular complications.

Keywords: Chronic kidney disease, cholesterol, Lipids.

INTRODUCTION

Chronic kidney disease (CKD) is a common disease nowadays. It is considered amongst diseases of geriatrics. The hallmark of the disease process is alteration in functional and structural integrity of the kidneys. There is marked changes in lipid profile such as total cholesterol, high density lipoprotein cholesterol, low density lipoprotein cholesterol and triglycerides etc. Although most striking lipid abnormalities are seen in nephrotic syndrome, hyperlipidaemia characterizes renal disease of every cause.[1]

There is rise in triglyceride (TG), elevated total cholesterol (TC), high density lipoprotein cholesterol (LDL-C) and reduced high density lipoprotein cholesterol (HDL-C). It is also observed that the level of total cholesterol may be normal or decreased in the presence of malnutrition.[2] The way of dyslipidaemia seen in CKD patients is highly atherogenic and is linked with establishment of atherosclerotic cardiovascular disease and subsequent mortality.[3] Dyslipidaemia is linked with frequent fall in renal function and beginning of RRT in CKD patients.[4] The exact mechanism of development of dyslipidaemia is not exactly known but it is hypothesized that mesangial cells bind and take up oxidized LDL resulting in trauma to mesangial, epithelial and endothelial cells by ensuring recruitment of inflammatory cells such as macrophages which release cytokines, chemokines and growth factors.[5]

Address for correspondence*

Dr. PV Satyanarayana
Associate Professor,
Kurnool Medical College,
Kurnool,
India

Glomerular filtration rate (GFR) can be decreased by using statins in CKD patients.[6] Considering this, we planned this study to assess the serum lipid profile in CKD patients.

METHODS

A sum total of seventy CKD patients of both genders were selected in this prospective, observational study. Institutional review board approved present study. All patients gave their written consent foe their participation in the study. The presence of CKD was established based on presence of kidney damage and level of kidney function glomerular filtration rate (GFR).

Demographic data such as name, age, gender etc. was recorded. Group I had CKD patients and group II had equal age and gender matched healthy subjects. All were subjected to ultrasonography (USG). Assessment of blood urea, serum creatinine, lipid profile such as total cholesterol, triglycerides, HDLc, LDLc, VLDLc were done with semi-autoanalyzer. The results were compiled and entered in MS excel sheet. Data was assessed using SPSS version 21.0. Mann Whitney U test was used for statistical analysis. P value less than 0.05 was set significant.

RESULTS

Table 1: Distribution of patients.

Gender	Group I (35)	Group II (35)
Male	20	18
Female	15	17

There were 20 males and 15 females in group I and 18 males and 17 females in group II [Table 1].

Table 2: Measurement of lipid profile.

Lipid profile	Group I	Group II	P value
Total cholesterol	132.4	147.6	0.05
TG	150.6	96.8	0.02
HDLc	32.2	44.1	0.03
LDLc	64.1	76.2	0.05
VLDLc	32.4	18.6	0.04

The mean total cholesterol was 132.4 mg/dl in group I and 147.6 mg/dl in group II. TG was 150.6 mg/dl in group I and 96.8 mg/dl in group II. HDLc was 32.2 mg/dl in group I and 44.1 mg/dl in group II. LDLc was 64.1 mg/dl in group I and 76.2 mg/dl in group II. VLDLc was 32.4 mg/dl in group I and 18.6 mg/dl in group II. A significant difference was (P< 0.05) observed in all groups [Table 2].

Table 3: Comparison of renal function test.

Renal function test	Group I	Group II	P value
Blood urea	126.1	30.4	0.01
Serum creatinine	6.4	0.98	0.01

The mean blood urea was 126.1 mg/dl in group I and 30.4 mg/dl in group II. The mean serum creatinine was 6.4 mg/dl in group I and 0.98 mg/dl in group II. The difference was significant (P< 0.05) [Table 3].

DISCUSSION

Chronic kidney disease (CKD) is a serious disease of high morbidity and mortality. Normal functioning of kidney is affected.[7] CKD results in worsening of kidney function, because of reduced effective functioning of renal tissues. In CKD patient, cardiovascular disease is a main reason of morbidity and mortality.[8,9] The high mortality rate in CKD patients is due to cardiovascular system (CVS) complications before patient reach stage 5 CKD.[10] It is also found that dyslipidaemia is a major risk factor for coronary heart disease and there is need of management of plasma lipids and lipoproteins in CKD patients.[11,12]

Dyslipidaemia is a variable cardiovascular risk factor, therefore early diagnosis and management with both lifestyle modification and lipid lowering medications will reduce cardiovascular disease risk and progression to end stage renal disease (ESRD).[13,14] Considering this, we planned this study to assess the serum lipid profile in CKD patients.

Our results showed that there were 20 males and 15 females in group I and 18 males and 17 females in group II. Rao et al.[15] explored the altered lipid, lipoprotein and apoprotein abnormalities along with lipoprotein (a) in chronic kidney disease patients with stage I to V which were further divided into group 1 (stage I and II), group 2 (stage III and IV) and group 3 (stage V). 50 chronic kidney disease patients with stage I to V and 20 healthy normal subjects as controls were recruited for this study. Among the various parameters tested triglyceride levels were high in group 1 and 2, whereas VLDL cholesterol, Lp (a) and apo B levels were significantly high in all the groups when compared to controls (P<0.05). However, LDL cholesterol level was significantly low in group 3 only as compared to control group (P<0.05). Apoprotein AI values also showed significant decrease in all groups as compared to controls (P<0.05). Though total cholesterol levels in group 1 and LDL levels in group 1 and 2 were higher than controls, but the values attained not statistically significant (P>0.05). High levels of VLDL cholesterol, Lp (a), apo B and low levels of apoprotein AI as reported in this study are the major lipid disorders in the development of cardiovascular complications at all the stages in these patients.

Our results showed that the mean total cholesterol was 132.4 mg/dl in group I and 147.6 mg/dl in group II. TG was 150.6 mg/dl in group I and 96.8 mg/dl in group II. HDLc was 32.2 mg/dl in group I and 44.1 mg/dl in group II. LDLc was 64.1 mg/dl in group I and 76.2 mg/dl in group II. VLDLc was 32.4 mg/dl in group I and 18.6 mg/dl in group II. Our results showed that mean blood urea was 126.1 mg/dl in group I and 30.4 mg/dl in group II. The mean serum creatinine was 6.4 mg/dl in group I and 0.98 mg/dl in group II. Rajman et al.[16] enrolled a sum total of thirty- three (33) non-dialysed patients with chronic renal failure (predial), 40 patients on continuous ambulatory peritoneal dialysis (CAPD), 42 haemodialysis patients (HD), 47 renal transplant recipients (RTR), and 44 controls. In all patients, their study plasma lipids and LDL subfraction profiles were examined. LDL subfractions separated by gel electrophoresis were scored by densitometric analysis. There was significantly rise in LDL scores (predial 1.36+/-0.6, CAPD 1.71+/-0.9, HD 1.68+/-0.9, RTR 1.92+0.8 vs control 0.87+0.4, all P<0.001) in all groups. In CAPD and HD patients, LDL scores were associated with serum triglyceride (r=0.81, P<0.001 and r=0.70, P<0.001 respectively), cholesterol (r=0.55, P<0.001 and r=0.49, P<0.01) and HDL-cholesterol (r= -0.43, P<0.01 and r= -0.51, P<0.01), on other hand no such relationship was seen in the pre-dialysis and RTR groups.

CONCLUSION

There was increased triglycerides, increased VLDL and reduced HDL in CKD patients leading to increased cardiovascular complications.

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