

**Research Article****A study of lipid profile in chronic kidney disease in non-diabetic patients**

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**ABSTRACT**

**Objective:**To study of lipid profile in chronic kidney disease in non-diabetic patients

**Materials and Methods:** Total 50 cases of non-diabetic chronic kidney disease, both males and females, period from January 2017 to June 2017 admitted in Fatima Memorial Hospital Lahore were taken for the study. For diagnosis, history and physical findings with supportive biochemical and sonological evidence was taken as criteria.

**Results:** The study revealed that among the total 50 patients, 27 patients showed abnormal lipid profile and 23 patients showed normal lipid profile. Total cholesterol value in controls and patients are  $186 \pm 26.3$  mg/dl and  $202 \pm 48.3$  mg/dl respectively ( $P=0.25$ ). However this difference was not significant. Triglycerides value in patients with CKD were significantly high as compared to controls  $166 \pm 71.8$  and  $97.17 \pm 17.1$  mg/dl respectively ( $P<0.001$ ). This is statistically highly significant. HDL values in chronic kidney disease patients are decreased compared to controls,  $36.96 \pm 6.77$  and  $51.0 \pm 10.24$  respectively ( $P<0.001$ ). This was statistically highly significant. LDL values were increased in patients compared to controls,  $121 \pm 46.51$  and  $116.4 \pm 29.2$  respectively ( $P=0.21$ ). However this difference was not significant. Significant increase in VLDL were found in patients as compared to controls  $33.18 \pm 14.35$  and  $19.4 \pm 3.4$  respectively  $P<0.001$ . This was statistically highly significant. There is a significant reduction HDL/TC ratio in patients as compared to controls,  $0.19 \pm 0.06$  and  $0.3 \pm 0.08$  respectively. This was statistically highly significant ( $P<0.001$ ).

**Conclusion:**The significant rise in triglyceride and VLDL concentrations is the cause for increase cardiovascular abnormalities in CKD patients. Significant reduction in HDL & HDL / Total cholesterol ratio are the important predictive indices for the risk of developing coronary artery disease in all groups of patients with CKD. This may be major contributory factor for enhanced atherogenesis in these patients. Finally because the lipid abnormalities in chronic kidney disease accelerate the progression of the kidney disease and predispose to atherosclerosis, it is worth while detecting and treating hyperlipidemia in these patients.

**Keywords:**Chronic kidney disease, Very low density lipoprotein, Low density lipoprotein, High density lipoprotein, Total cholesterol.

**INTRODUCTION**

Chronic kidney disease (CKD) encompasses a spectrum of different pathophysiologic processes associated with abnormal kidney function, and a progressive decline in glomerular filtration rate (GFR). The term *chronic renal failure* applies to the process of continuing significant irreversible reduction in nephron number, and typically corresponds to CKD stages 3–5<sup>1</sup>. Cardiovascular disease (CVD) is a major cause of mortality in

patients with mild to moderate CKD and end stage renal disease (ESRD)<sup>2</sup>. Dyslipidemia has been established as a well-known traditional risk factor for CVD in CKD and large-scale observational studies have shown that total and low-density lipoprotein (LDL) cholesterol are most important independent predictors of cardiovascular morbidity and mortality<sup>3</sup>. Abnormal lipid and lipoprotein concentrations in patients with CKD

may be cause of their high-risk of atherosclerosis and lipoprotein (a) [Lp(a)], lipoproteins and apolipoproteins composition which would be an index of increased atherogenic status<sup>4</sup>. Several prospective studies suggest that lipid abnormalities principally present in CKD is hypertriglyceridemia. Elevated triglyceride levels are due to impaired activity lipoprotein lipase (LPL) and direct inhibitory effect of various uremic 'toxins' on the enzymes involved in lipid metabolism<sup>5</sup>, represent the most important pathophysiological mechanisms underlying the development of hypertriglyceridemia in renal failure.

### MATERIAL AND METHODS

This cross sectional study was conducted at Fatima Memorial Hospital Lahore from January 2017 to June 2017. Total 50 patients with history and physical findings of kidney disease for a duration of more than 6 months and biochemical analysis suggestive of Chronic kidney disease, sonological findings with a radiological opinion suggesting Chronic kidney disease both male or female were selected. Patients below the age of 20 years and patients with diabetes mellitus were excluded from the study. The control group was formed by 25 healthy persons which was age and sex matched to the study group.

Approval was taken from institutional review committee. Written informed consent was taken from every patient. 5ml blood sample was taken of all patients and send to laboratory for lipid profile, blood urea, Serum creatinine, total protein, serum albumin. Findings were noted on pre-designed proforma.

All the collected data was entered in SPSS version 20 and analyzed. Mean and SD was calculated for numerical data and frequencies were calculated for categorical data. Comprasion of lipid profile between cases and controls was done by using t test. P value  $\leq 0.05$  was considered as significant.

### RESULTS

Fifty patients of chronic kidney disease and 25 normal subjects (control) were taken for present study. Lipid levels like TC, TG, HDL, LDL, and VLDL were estimated for both controls and patients and were compared. Mean and standard values for urea in controls and patients showed a considerable difference which was found to be highly significant ( $P < .001$ ). Creatinine levels in patients were very high as compared to controls. This difference was statistically significant ( $P < .001$ ). Mean total protein was significantly reduced as compared to controls ( $P < .01$ ) So also albumin levels are reduced in patients as compared to control ( $P < 0.001$ ). The difference was found to be highly significant. (Table 1)

Total cholesterol value in controls and patients are  $186 \pm 26.3$  mg/dl and  $202 \pm 48.3$  mg/dl respectively ( $P = 0.25$ ). However this difference was not significant. Triglycerides value in patients with CKD were significantly high as compared to controls  $166 \pm 71.8$  and  $97.17 \pm 17.1$  mg/dl respectively ( $P < 0.001$ ). This is statistically highly significant. HDL values in chronic kidney disease patients are decreased compared to controls,  $36.96 \pm 6.77$  and  $51.0 \pm 10.24$  respectively ( $P < 0.001$ ). This was statistically highly significant.

LDL values were increased in patients compared to controls,  $121 \pm 46.51$  and  $116.4 \pm 29.2$  respectively ( $P = 0.21$ ). However this difference was not significant. VLDL : significant increase in VLDL were found in patients as compared to controls  $33.18 \pm 14.35$  and  $19.4 \pm 3.4$  respectively  $P < 0.001$ . This was statistically highly significant. HDL/TC - there is a significant reduction HDL/TC ratio in patients as compared to controls,  $0.19 \pm 0.06$  and  $0.3 \pm 0.08$  respectively. This was statistically highly significant ( $P < 0.001$ ). Among the total 50 patients, 27 patients showed abnormal lipid profile and 23 patients showed normal lipid profile.

**Table 1 :** bio-chemical data in control and kidney disease patients

Groups	Blood urea	Serum creatinine	Total Protein	Serum albumin
Controls (n=25)	13.88±4.52	0.73±0.31	6.8±0.4	4.2±0.3
Patients (n=50)	201.42±82.87	9.54±2.96	5.9±0.7	3.4±0.4
t-value* Significance	11.26 P<.001	14.79 P<.001	5.94 P<.01	8.82 P<.001

**Table 2 :** biochemical (lipid profile) data in controls and kidney disease patients

Groups	Controls (n=25)	Patients (n=50)	t-value*	Significance
Total cholesterol	186 ±26.3	202 ±48.3	1.54	NS (P=0.12)
Triglycerides	97.17 ±17.1	166.2 ±71.8	4.71	P<.001
HDLc	51.0 ±10.24	36.96 ±6.77	7.09	P<.001
LDLc	116.4 ±29.2	121 ±46.51	0.44	NS (P=0.65)
VLDLc	19.4 ±3.4	33.18 ±14.35	4.72	P<.001
HDL/TC	0.3 ±0.08	0.19 ±0.06	6.67	P<.001

## DISCUSSION

The results of the study on the lipid profile in patients with chronic kidney disease show that there are significant deviations in the lipid profiles of these patients as compared to controls. In this study triglycerides were markedly elevated compared to control group and statistically (P value <0.001) highly Significant. Attman P.O., Alaupovic P., stated, hypertriglyceridemia is the most common plasma lipid abnormality in adult patients and children with renal failure<sup>6</sup>. The relationship between hypertriglyceridemia and atherosclerotic heart disease is for less clear, some found to be a risk factor but others not.<sup>7-8</sup> Cholesterol values were raised in patients as compared to controls but this value was statistically not significant. Gerald Appel, found low values of cholesterol in CKD patients<sup>9</sup>. Anderson et al., found hypercholesterolemia in 20% of patients<sup>10</sup>. There was decrease in HDL cholesterol seen in patients compared to controls, which was statistically significant (P<0.001). Goldberg et al., found decrease in HDL concentration in patients compared to controls<sup>11</sup>. Rapoport, Aviram, study showed there is no decrease in HDL concentration in chronic kidney disease patients<sup>12</sup>. Fuh MMT et al<sup>13</sup>., found decrease in

plasma HDL cholesterol concentration seen in patients with chronic kidney disease is associated with decrease in both the fractional catabolic rate and the total synthetic rate of apoAI/HDL.

There is marginal rise of serum total cholesterol in chronic kidney disease patients, compared to controls but this rise was not statistically significant (P=0.25). Shah et al, in their study showed no significant change in levels of total cholesterol<sup>14</sup>. There is significant raise in VLDL levels in chronic kidney disease patients compared to controls (P<0.001). Cheung showed increase in very low density lipoproteins<sup>15</sup>. The LDL levels were marginally raised in patients as compared to controls and this was not statistically significant (P=0.21). Anderson et al., showed increase in LDL levels<sup>10</sup>. Gerald Appel et al., showed normal or decrease in LDL levels<sup>9</sup>.

## CONCLUSION

The significant rise in triglyceride and VLDL concentrations is the cause for increase cardiovascular abnormalities in CKD patients. Significant reduction in HDL & HDL / Total cholesterol ratio are the important predictive indices for the risk of developing coronary artery disease in all groups of patients with CKD. This may be major contributory factor

for enhanced atherogenesis in these patients. Finally because the lipid abnormalities in chronic kidney disease accelerate the progression of the kidney disease and predispose to atherosclerosis, it is worth while detecting and treating hyperlipidemia in these patients.

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