Original Article

# A Comparative Study of Lipid Profile in Chronic Renal Failure Patients on Dialysis

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## Abstract

**Background:** Chronic renal failure (CRF) is characterized by irreversible destruction of nephrons along with decrease glomerular filtration and suppressed urine. Disturbance of lipid profile in CRF has been found associated with increased triglycerides (TG) and low high density lipids while normal level of total cholesterol (TC) and low density lipids (LDL). Dislipidemia in CRF patients induces cardiovascular diseases (CVD); in addition, CVD in turn leads to more rapid destruction of kidney. Therefore the present study was designed to evaluate the lipid profile in CRF patients with and without dialysis. **Subjects and Methods:** This was a prospective type of study conducted in the department of medicine of a tertiary care centre. Total 100 patients of CRF patients and 40 normal control subjects were recruited for the study. CRF patients were divided into two groups. Group I consisted CRF patients with dialysis and group II included CRF patients without dialysis. Normal subjects were kept under group III control group. **Results:** Results of the present study revealed that there was a significant difference between TG, HDL and VLDL of group I ($p>0.01$) and group II ($p>0.01$) in comparison of group III. Nevertheless, there was no significant difference between the TC and LDL of all groups. **Conclusion:** CRF patients either with dialysis or without dialysis have a great possibility of developing dyslipidemia as well as CVD. Dialysis has been found effective in reducing nitrogenous waste products in blood; however, it is not able to decrease lipid profile in CRF patients.

**Keywords:** Chronic renal failure, triglycerides, CVD, dialysis.

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## Introduction

Chronic renal failure (CRF) is characterized by irreversible destruction of nephrons along with decrease glomerular filtration and suppressed urine.[1] Broad spectrum sign s and symptoms along with alteration of biochemical parameters are found in the case of CRF.[2] CRF leads to disorders in cardiovascular system, gestrointestinal system, skin, skin and central nerous system.[3] Dyslipdemia is an early disorder which develop in the starting of CRF.Most of the CRF patients suffer with dyslipidemia due to alteration in lipid metabolisim as there is imbalance between synthesis and degradation of lipid mechanicisam.[4,5]

Disturbance of lipid profile in CRF has been found associated with increased triglycerides (TG) and low high density lipids while normal level of total cholesterol (TC) and low density lipids (LDL). Dislipidemia in CRF patients induces cardiovascular diseases (CVD); in addition, CVD in turn leads to more rapid destruction of kidney.[6] Various CVD including atherosclerosis, hypertension and ischemic heart disease have been caused due to altered level of lipid profile in CRF patients. CRF progressively results in end stage renal diseases (ESRD) along with increased pathology of CVD; higher rate of morbidity and mortality due to CVD in CRF patients. Moreover, more CRF patients are likely die with CVD instead of ESRF.[8]

Therefore the present study was designed to evaluate the lipid profile in CRF patients with and without dialysis.

## Subjects and Methods

This was a prospective type of study conducted in a tertiary care centre. Total 100 patients of CRF and 40 normal control subjects were recruited for the study. CRF patients were divided into two groups. Group I consisted CRF patients with dialysis and group II included CRF patients without dialysis. Normal subjects were kept under group III control group. Informed written consent was taken from each and participant of the study before they participated in the study. This study was approved from the ethical committee of the TMMC & RC, Moradabad. Exclusion criteria for the study included obesity, hypertension, diabetes mellitus, ischemic heart disease, tuberculosis and patients on lipid lowering medicines.

Collection of sample- Fasting blood samples (5ml) were collected in tubes. After that samples were allowed to clot than samples were centrifuged to separate serum.

### Biochemical estimation

Serum concentration of total cholesterol was estimated by the enzymatic CHOD-POD method.[9] Serum concentration of triglycerides was measured by the GPO-PAP method.9

Serum concentration of high density lipoprotein was measured by CHOD-POD/ Phosphotungstate method.[9] Serum concentration of low density lipoprotein (LDL) and VLDL were measured by using the Friedewald's formula.[9]
Statistical analysis – All the results were presented as mean ± SD. A p value <0.05 was considered as significant. Unpaired t test was used to evaluate the result of the study.

## Results

[Table 1] Shows baseline characteristics of the study participants. It is evident from the [Table 1] that there was no significance difference between the age and BMI of all three groups subjects. However, there was a significant difference between the urea and creatinine of group I (p>0.01), and group II (p>0.01) in comparison of group III. Further, table 2 revealed that there was a significant difference between TG, HDL and VLDL of group I (p>0.01) and group II (p>0.01) in comparison of group III. Nevertheless, there was no significant difference between the TC and LDL of all groups.

**Table 1: Baseline Characteristics of Study Population**

| | Group I (n=50) | Group II (n=50) | Group III (n=40) |
|---|---|---|---|
| Age (years)Mean ±SD | 43.77±10.74 | 44.55±11.56 | 43.66±10.4 |
| Sex (M/F) | 27/23 | 29/21 | 23/17 |
| BMI(kg/m2) | 22.17±1.84 | 22.32±1.25 | 22.73±1.64 |
| Urea(mg/dl) | 109±26.4* | 146.8± 41.8* | 26.3±6.76 |
| Creatinine (mg/dl) | 6.16± 1.75* | 12.87±3.65* | 0.81±0.27 |

*= significant (p>0.01)

**Table 2: Lipid Profile among Control and CRF Patients.**

| Parameters (mg/dl) | Group I (n=50) | Group II (n=50) | Group III (n=40) |
|---|---|---|---|
| TC | 44.37±12.3 | 42.16±12.6 | 182.8±16.2 |
| TG | 244.3±22.4* | 210.7±21.7* | 146.56±17.3 |
| HDL | 28.27±7.54* | 34.22±8.45* | 44.7±11.34 |
| LDL | 112.3±7.2 | 102.3±5.6 | 107.5±4.6 |
| VLDL | 43.16±2.08* | 41.27±3.6* | 27.19±1.14 |

*= significant (p>0.01)

**Table 3: Lipid Profile between CRF Patients with or Without Hemodialysis.**

| | TG | TC | HDL | LDL | VLDL |
|---|---|---|---|---|---|
| CRF patients with dialysis | Increased | No change | decreased | No change | Increased |
| CRF patients without dialysis | Increased | No change | decreased | No change | Increased |

## Discussion

CRF is one of the leading causes of morbidity and mortality through the world especially in developing countries like India. Patients suffering with CRF have high risk of CVD. Atherosclerosis and other CVD has been found associated with CRF. Moreover, most of the patients with CRF die due to CVD instead of ESRD.[10] Dyslipidemia is one of the most important factors which contribute to the atherosclerosis and severity of CVD in CRF patients.[11] CRF impaired the lipid metaboloism and induces imbalance between production and destruction of lipoproteins especially HDL and TG.[12] The present study showed there was increase of TG in patients of CRF with dialysis in comparison of CRF patients without dialysis and control subjects. The finding of the present study are consistent with the findings of the prior studies of Amin et al,[6] Vaziri et al.[13] and Saland et al.[14] as they observed similar changes in lipid profile of CRF patients on haemodylasis. It has been suggested in literature that alteration of lipid metabolism start with the starting of CRE and manifested itself by increasing TG.[15] Results of the present study have shown that there were significant difference between lipid profile (p>0.01) of CRF patients with haemodylasis and control subjects. These findings are similar to the findings of Gupta DK,[16] Das BSet al,[17] Zoccali C and Chan et al Further,[18,19] Janicki et al and Reddy et al also observed the similar disturbance of lipid profile in CRF patients.[20.21] Activities of hepatic lipase and post heparin plasma lipoprotein have been found decreased in CRF patients. Moreover, ratio of CII vs apo CIII has been found reduced. This increased level of TG may be due to increase of apo CIII as it increase the half life of VLDL.[22-24] Nevertheless, cause of lipolytic activity in the patients of CRF with haemodylasis is not clear yet.
Findings of the present study suggest that hemodialysis was insufficient to treat dyslipidemia in CRF patients.

## Conclusion

CRF patients either with dialysis or without dialysis have a great possibility of developing dyslipidemia as well as CVD. Dialysis has been found effective in reducing nitrogenous waste products in blood; however, it is not able to decrease lipid profile in CRF patients. There results of the present study suggest that lipid profile should be carefully observed and treated to decrease the risk of CVD in CRF patients with or without dialysis.

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