

# Dyslipidemia in Chronic Renal Failure Patients: A Clinical Study at Tertiary Care Hospital, Bikaner

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## ABSTRACT

**Background:** Chronic Kidney Disease (CKD) exhibits dyslipidemia which is well known traditional risk factors for vascular complications. So, this present study was planned to evaluate whether hemodialysis has an effect on the lipid profile of the CRF patients.

**Materials & Methods:** Present study were divided into three groups, Group-I: healthy controls (21), Group-II: CRF patients who never undergone hemodialysis (13) and Group-III: CRF patients on hemodialysis (18). Serum samples from patients and healthy subjects were obtained and analyzed for lipid profile.

**Results:** Serum triglyceride and VLDL levels were significantly higher in group-II and III when compared to controls. HDL levels were significantly lower in group-II and III as compared to control. There was significant change noted in total cholesterol and LDL levels between controls and CRF patients.

**Conclusion:** Our analysis suggest that CRF patients with and

without hemodialysis exhibited dyslipidemia pattern irrespective of hemodialysis process.

**Keywords:** Chronic Renal Failure, Hemodialysis, Lipid Profile.


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## INTRODUCTION

Dyslipidemias is a very common complication of Chronic Renal Failure (CRF). Disturbances in lipoprotein metabolism are evident even at the early stages of CRF and usually follow a downhill course that parallels the deterioration in renal function. Recently published studies indicate that dyslipidemias in these patients may actively participate in the pathogenesis of Cardiovascular disease (CVD) as well as in the deterioration of renal function.<sup>1</sup> The characteristic lipid abnormalities seen in CRF patients are elevated triglycerides, normal/reduced total cholesterol (TC), decreased High Density Lipoprotein (HDL), normal Low Density Lipoprotein (LDL).<sup>2</sup>

Progressive CRF not only leads to End stage renal disease (ESRD), but it is associated with high cardiovascular morbidity & mortality. In fact, patients with CRF are much more likely to die because of dyslipidemias than to progress to ESRD.<sup>3</sup> With the implication of plasma lipids in the pathogenesis of atherosclerosis and ischemic heart disease, it becomes worthwhile to study the behavior of various lipid fractions in CRF patients.<sup>4</sup> CVD constitutes the major cause of death in patients with ESRD and it is still higher in hemodialysis patients than in post transplantation patients.<sup>5</sup> ESRD Patients on hemodialysis have abnormalities in lipoprotein structure and metabolism and have a high incidence of

cardiovascular diseases.<sup>6</sup> Keeping in view the different outcomes of the researchers regarding hemodialysis modality in CRF patients, the present study was designed to see any impact of hemodialysis on lipid profile in CRF patients.

## MATERIALS AND METHODS

This prospective, observational study was carried out at S. P. Medical College Bikaner between 2016 - 2017. Informed consent from patients and institutional ethical approval was obtained. 31 patients of CRF and 21 healthy controls were recruited for this study. In order to understand the influence of dialysis on lipid profile, the patients were divided into 2 groups: those who have CRF but undialysed and those who are on maintenance hemodialysis for more than 6 months. Thus, study was divided into Group-I (healthy controls), Group-II (CRF patients who have never undergone hemodialysis) and Group-III (CRF patients on hemodialysis). Exclusion criteria include Body mass index (BMI) more than 24.9 kg/m<sup>2</sup>, known case of acute renal failure/diabetes mellitus/ischemic heart disease, taking drugs that affect lipids and pregnancy. Serum total cholesterol (TC), triglycerides (TGs), HDL cholesterol (HDL-C), LDL cholesterol (LDL-C), urea and creatinine, were measured colorimetrically using commercially

available kits on fully auto analyzer of Clinical Biochemistry Laboratory. In data analysis, comparison of parameters was done by using unpaired t-test.

Dyslipidemia was considered to be present if any of the following was present (NCEP guidelines, ATP panel 2)

Total Cholesterol > 200 mg/dl.

Triglyceride > 200mg/dl.

HDL Cholesterol <35 mg/dl in males and < 45 mg/dl in females.

LDL Cholesterol > 130 mg/dl.

**RESULTS**

The baseline characteristics of study population are shown in table I.

Table II revealed the biochemical parameters among control and CRF patients with and without hemodialysis. Among 3 groups,

90% patients of CRF with hemodialysis have elevated triglyceride level and 80% patients without hemodialysis have elevated triglyceride level as compared to controls (p<0.01). There is significant difference observed between total cholesterol levels in controls and CRF patients with or without hemodialysis. HDL cholesterol levels reduced in CRF patients with and without hemodialysis as compared to controls (p<0.001). Reduction in HDL cholesterol is observed in 60% of the CRF patients with hemodialysis as compared to 55% in CRF patients without hemodialysis (p<0.01). There is significant difference observed between LDL cholesterol levels in controls and CRF patients with or without hemodialysis. There was no significant difference observed between lipid profile levels in male and female patients in CRF patients with and without hemodialysis and in control group.

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

	Group 1(n 21)	Group 2(n13)	Group 3(18)
<b>Age (Mean +/-)SD</b>	41.95+/-11.59	43.45+/-10.33	46.67+/-11.67
<b>Sex(m/f)</b>	17/4	8/5	11/7
<b>BMI(Kg/m<sup>2</sup>)</b>	23.3+/-1.34	22.12+/-0.45	21.37+/-1.34
<b>Urea(mg/dl)</b>	24.3+/-5.66	108.2+/-45.6	122+/-36.2
<b>Creatinine(mg/dl)</b>	0.76+/-0.34	07.67+/-2.45	09.66+/-2.98

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

Parameters(mg/dl)	Group 1(n 21)	Group 2(n 13)	Group 3(n18)
<b>TC</b>	138.48	212.69	200.65
<b>TGs</b>	169.43	223.69	225.84
<b>HDL</b>	44.90	39.00	38.11
<b>LDL</b>	58.76	127.21	118.62

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

	TGs	TC	HDL	LDL
<b>CRF patients without dialysis</b>	Increased	Increased	Decreased	Increased
<b>CRF patients with dialysis</b>	Increased	Increased	Decreased	Increased

**DISCUSSION**

CRF is a worldwide health problem and is the leading cause of morbidity and mortality in the developed world. Patients with CRF are at high risk for cardiovascular disease and cerebrovascular diseases and they are more likely to die of Cardiovascular Disease than to develop ESRD. CRF is associated with premature atherosclerosis and increased incidence of cardiovascular morbidity and mortality.<sup>7</sup> Several factors contribute to atherogenesis and cardiovascular disease in patients with CRF, the notably among all is dyslipidemias.<sup>8</sup> Chronic renal failure, per se, primarily affects the metabolism of high-density lipoprotein (HDL) and triglyceride (TG)-rich lipoproteins. in table III which were also supported by Janicki et al.<sup>9</sup> The characteristic dyslipidemias observed in CRF patients without hemodialysis in this study are shown in table III which were also reported by Amin et al (2006)<sup>2</sup>, Vaziri et al (2006)<sup>10</sup> and Saland et al (2007).<sup>11</sup> Cardiovascular disorders are one of the most serious problems in chronic hemodialysis patients. The mortality due to cardiovascular disease in hemodialysis patients is estimated to be 9% annually and is 30 times higher than that observed in the general

population.<sup>12</sup> Dyslipidemias observed in CRF patients with hemodialysis in this study are shown (2007)<sup>13</sup>, Mekki et al (2009)<sup>14</sup> and Reddy et al (2009).<sup>15</sup> Indian studies on Lipid profile in CRF like Gupta<sup>19</sup>, Das et al <sup>20</sup> and Shah et al<sup>21</sup> observed Lipid abnormalities similar to those reported in western studies i.e. hypertriglyceridemia and reduced HDL. The present study demonstrates that in CRF patients there was significantly deranged total cholesterol, LDL cholesterol, HDL cholesterol, Triglycerides and secondly study demonstrates that in CRF patients even hemodialysis fails to treat dyslipidemia generated by CRF.

**CONCLUSION**

CRF patients with and without hemodialysis are at high risk of development of dyslipidemias. Hemodialysis can effectively reduce the accumulation of nitrogenous waste products but fails to clear dyslipidemias generated during the course of CRF. A strict monitoring of lipid profile and lipoproteins may reduce the morbidity and mortality rate and will also improve the quality of life of CRF patients.

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