Lipid profile in Chronic Kidney Disease before and after hemodialysis

Authors
Dr Rupam Kumari¹, Dr Chakradhar Majhi², Dr L.K. Dash³
¹Junior Resident, Department of General Medicine, VIMSAR, Burla
²Associate Professor, Department of General Medicine, VIMSAR, Burla
³Professor, Department of General Medicine, VIMSAR, Burla

Abstract
Introduction: cardiovascular complications were the major cause of mortality morbidity and mortality in hemodialysis patients.
Objective: To know the effect of hemodialysis on lipid profile in CKD patients.
Study Design: Hospital based observational study.
Study Setting: This study was done in department of general medicine VIMSAR, Burla, Odisha.
Subjects and Methods: 100 patients of CKD on maintenance Hemodialysis were selected as study population diabetic Mellitus, liver disease and other causes of Dyslipidemia and metabolic were kept as exclusion criteria. Serum lipid profile was measured at the start of hemodialysis and subsequently after 6 months and 12 months of maintenance hemodialysis and those values were tabulated for comparison.
Results: In our study, serum triglyceride value after 6 months and 1 year after maintenance hemodialysis, was significantly elevated and serum HDL was significantly decreased as compared to those predialysis values.
Conclusion: Dyslipidemia is common in CKD Patients, Maintenance hemodialysis further deteriorates dyslipidemia in the form of further increase in serum triglyceride and decrease in HDL. This increase in risk of cardiovascular disease and further progression of CKD.
Keywords: Chronic kidney disease, dyslipidemia, lipid profile, HDL, hemodialysis.

Introduction
Chronic kidney disease encompasses a spectrum of pathophysiological process associated with abnormal kidney function and a progressive decline in glomerular filtration rate. Patients of chronic kidney disease prone to several risk factors for atherosclerosis such as oxidative stress, endothelial dysfunction and dyslipidemia. Lipid abnormality mainly include low level of HDL-C and elevated level of triglycerides and triglyceride rich lipoproteins. chronic kidney disease increases cardiovascular risk which escalates with declining kidney function and it is maximal in patients with end stage renal disease on maintenance hemodialysis. So, it is was worthwhile to study impact of hemodialysis on lipid profile in CKD patients.

Aims and Objectives
1. To study lipid profile in patients of CKD.
2. To study impact of hemodialysis on lipid profile of patients in CKD.
Materials and Methods
Hospital based observational study was done in department of general medicine, VIMSAR, Burla, Odisha from November 2016 to October 2018 (24 months). 100 patients of CKD (51 male and 49 female) on maintenance hemodialysis were selected. There were hemodialyzed twice in a week for at least 3 to 4 hours per session. Patients with diabetes mellitus, hypothyroidism; history of alcohol and smoking, liver disease, patients on lipid lowering therapy were excluded from study population. 12 hours fasting blood sample were taken, serum total cholesterol (TC), triglycerides, HDL were measured using commercial available kit. VLDL and LDL was calculated by using friedewald’s formula. Lipid profile predialysis, postdialysis (6 months) and postdialysis (12 months) were tabulated for the study.

Results and Observation
Age Distribution
Age of the patients varied from 30 yrs to 60 yrs. Majority of patients fall in the age group 50-60 years.

<table>
<thead>
<tr>
<th>Age in years</th>
<th>No. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-40</td>
<td>11</td>
</tr>
<tr>
<td>40-50</td>
<td>30</td>
</tr>
<tr>
<td>50-60</td>
<td>59</td>
</tr>
</tbody>
</table>

Sex Distribution
Male constitutes 59(59%) and female constitutes 41(41%) in this study.

Table 1: Comparison of predialysis serum triglyceride, total cholesterol, HDL, LDL AND VLDL level with post-dialysis (6 months)

<table>
<thead>
<tr>
<th>Hemodialysis status</th>
<th>Serum triglyceride</th>
<th>Total cholesterol</th>
<th>HDL</th>
<th>LDL</th>
<th>VLDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before dialysis</td>
<td>130 ± 9.6</td>
<td>205 ± 10.6</td>
<td>36.3 ± 3.85</td>
<td>142.70 ± 1.11</td>
<td>26.08 ± 1.91</td>
</tr>
<tr>
<td>6 months after dialysis</td>
<td>153.42 ± 16.95</td>
<td>207.01 ± 5.91</td>
<td>31.82 ± 3.78</td>
<td>144.50 ± 10.27</td>
<td>30.68 ± 3.39</td>
</tr>
</tbody>
</table>

Serum triglyceride, HDL and VLDL values after 6 months of hemodialysis were significantly changed. (P<0.05) as compared to predialysis values, total cholesterol and LDL were not significantly changed as compared to predialysis value.(P>0.05)

Table 2: Comparison of postdialysis (6 months) serum triglyceride, total cholesterol, HDL, LDL AND VLDL level with post-dialysis (12 months)

<table>
<thead>
<tr>
<th>Hemodialysis status</th>
<th>Serum triglyceride</th>
<th>Total cholesterol</th>
<th>HDL</th>
<th>LDL</th>
<th>VLDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months after dialysis</td>
<td>153.42 ± 16.95</td>
<td>207.01 ± 5.91</td>
<td>31.82 ± 3.78</td>
<td>144.50 ± 10.27</td>
<td>30.68 ± 3.39</td>
</tr>
<tr>
<td>12 months after dialysis</td>
<td>173.39 ± 19.88</td>
<td>206 ± 11.51</td>
<td>26.65 ± 2.98</td>
<td>144.67 ± 11.66</td>
<td>34.67 ± 3.97</td>
</tr>
</tbody>
</table>

Serum triglyceride, HDL and VLDL, postdialysis (12 months) values were significantly changed. (P<0.05) as compared to postdialysis(6 months) values, total cholesterol and LDL were not significantly changed.(P>0.05).

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 CVD and cerebrovascular disease (CBVD), and they are more likely to die of CVD than to develop ESRD. CRF is associated with premature atherosclerosis and increased incidence
of cardiovascular morbidity and mortality. Several factors contribute to atherogenesis and cardiovascular disease in patients with CRF, the notably among all is dyslipidemias. Chronic renal failure, per se, primarily affects the metabolism of high-density lipoprotein (HDL) and triglyceride (TG)-rich lipoproteins. In the present study we found hypertriglyceridemia in CRF patients with and without hemodialysis. This elevated triglyceride level is because of decreased activity of lipoprotein lipase (LPL) which hydrolyses triglycerides and also enhanced triglyceride synthesis in liver from free fatty acids released from fatty tissue and muscles.

Once hemodialysis commences, continuous hemodialysis patients develop atherogenic serum lipid profile. Triglycerides, VLDL-C level was found elevated and HDL decreased after maintenance hemodialysis. In a study by Deighan CJ, Caslake MJ, McConnel revealed the same lipid changes in dialysis patients. Shoji T, and Huttunnen JK tested the role of heparin in pathogenesis of hemodialysis induced dyslipidemia revealed the same changes.

**Conclusion**

CRF patients on maintenance hemodialysis are at greater risk of development of dyslipidemia, characterized by hypertriglyceridemia, elevated VLDL and decreased HDL levels without any discrimination of sex. Hemodialysis can effectively reduce the accumulation of nitrogenous waste products but fails to clear dyslipidemia generated during the course of CRF. On the basis of the findings of the present study, it is further suggested that prescribing lipid lowering treatment in CRF patients with dyslipidemias for preventing future episode of cardiovascular events could help and will also preserve renal function. A strict monitoring of lipid profile and lipoproteins can reduce the morbidity and mortality.

**References**


