

**Research Paper****Lipid profile in Chronic Kidney Disease before and after hemodialysis**

Authors

**Dr Rupam Kumari<sup>1</sup>, Dr Chakradhar Majhi<sup>2</sup>, Dr L.K. Dash<sup>3</sup>**<sup>1</sup>Junior Resident, Department of General Medicine, VIMSAR, Burla<sup>2</sup>Associate Professor, Department of General Medicine, VIMSAR, Burla<sup>3</sup>Professor, 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.***Study Duration:** *Nov 2016 to Oct 2018(24 Months).***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.<sup>(1-4)</sup>

Lipid abnormality mainly include low level of HDL-C and elevated level of triglycerides and triglyceride rich lipoproteins.<sup>(5-7)</sup> 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.<sup>(8-10)</sup> 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<sup>1</sup>. Lipid profile predialysis, postdialysis (6 months) and postdialysis (12 months) were tabulated for the study.

**Results and Observation**

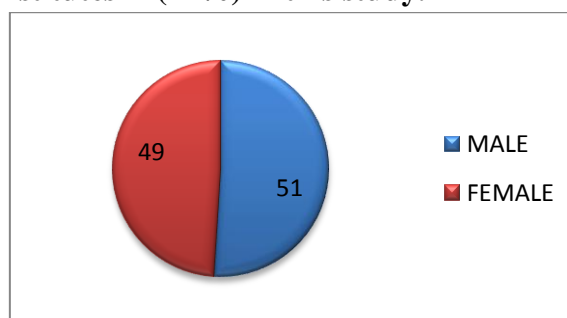
**Age Distribution**

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

Age in years	No. of cases
30-40	11
40-50	30
50-60	59

**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 (6months)

Hemodialysis status	Serum triglyceride	Total cholesterol	HDL	LDL	VLDL
Before dialysis	130 ± 9.6	205±10.6	36.3 ±3.85	142.70±1.11	26.08 ±1.91
6 months after dialysis	153.42±16.95	207.01±5.91	31.82±3.78	144.50±10.27	30.68±3.39
	P<0.05	P>0.05	P<0.05	P>0.05	P<0.05

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).

Hemodialysis status	Serum triglyceride	Total cholesterol	HDL	LDL	VLDL
6 months after dialysis	153.42±16.95	207.01±5.91	31.82±3.78	144.50±10.27	30.68±3.39
12 months after dialysis	173.39±19.88	206 ±11.51	26.65±2.98	144.67±11.66	34.67±3.97
	P<0.05	P>0.05	P<0.05	P>0.05	P<0.05

Serum triglyceride, HDL and VLDL, postdialysis (12months) 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.<sup>11</sup> Chronic renal failure, per se, primarily affects the metabolism of high-density lipoprotein (HDL) and triglyceride (TG)-rich lipoproteins.<sup>12</sup>

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<sup>13</sup>.

Once hemodialysis commences, continuous hemodialysis patients develop atherogenic serum lipid profile. Triglycerides, VLDL-C level was found level was found elevated and HDL decreased after maintenance hemodialysis.

In a study by Deighan CJ, Caslake MJ, McConnel reveled the same lipid changes in dialysis patients. Shoji T, and Huttunen JK tested the role of heparin in pathogenesis of hemodialysis induced dyslipidemia reveled the same changes.<sup>(14,15)</sup>

### 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

1. Himmelfarb J, Stenvinkel P, Ikizler TA, Hakim R. The elephant in uremia: Oxidant stress as an underlying concept of cardiovascular disease in uremia. *Kidney Int.* 2002;62: 1524–1538.
2. Mc Cullough PA. Why is kidney disease the “spoiler” for cardiovascular outcomes? *J Am Coll Cardiol.* 2003;41:725–728.
3. Stevinkel P, Alvestrand A. Inflammation in end-stage renal disease: Sources, consequences, and therapy. *Semin Dial.* 2002;15:329–337.
4. Samouilidou E, Grapsa E. Effect of dialysis on total antioxidant capacity and lipid peroxidation products in patients with endstage renal failure. *Blood Purif.* 2003;21:209–212.
5. Shoji T, Ishimura E, Inaba M, Tabata T, Nishizawa Y. Atherogenic lipoproteins in end-stage renal disease. *Am J Kidney Dis.* 2001;38:S30–S33.
6. Kaysen G. Lipid and lipoprotein metabolism in chronic kidney disease. *J Ren Nutr.* 2009;19:73–77.
7. Liu J, Rosner MH. Lipid abnormalities associated with end- stage renal disease. *Semin Dial.* 2006;19:32–40.
8. Go AS, Chertow GM, Fan D, McCulloch CE, Hsu CY. Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. *N Engl J Med* 2004;351:1296–305.
9. Muntner P, He J, Astor BC, Folsom AR, Coresh J. Traditional and nontraditional risk factors predict coronary heart disease in chronic kidney disease: results from the Atherosclerosis Risk in Communities study. *J Am Soc Nephrol* 2005;16:529–38.
10. Foley RN, Parfrey PS, Sarnak MJ. Clinical epidemiology of cardiovascular disease in chronic renal disease. *Am J Kidney Dis* 1998;32:S112–9.

11. Agarwal SK, Srivastava RK. Chronic Kidney Disease in India: Challenges and Solutions. *Nephron Clinical Practice*. 2009; 111:c197-c203.
12. Vaziri ND, Moradi H. Mechanisms of Dyslipidemia of chronic renal failure. *Hemodialysis International*. 2006; 10:1-7.
13. Janicki K, Molas G, Furmaga J. Abnormal lipoprotein metabolism in hemodialysis patients, *Annales Universitatis Mariae Curie – Skłodowska Lublin Polonia*. 2007; 62:311-14.
14. Shoji T, Nishizawa Y, Nishitani H, Yamakawa M, Morii H. Impaired metabolism of high density lipoprotein in uremic patients. *Kidney Int* 1992; 41: 1653-61.
15. Huttunen JK, Pasternack A, Vanttinen T, Ehnholm C, Nikkila EA. Lipoprotein metabolism in patients with chronic uremia. Effect of hemodialysis on serum lipoproteins and postheparin plasma triglyceride lipases. *Acta Med Scand* 1978; 204: 211-8.