

## To compare the clinical parameters and lipid profile in chronic kidney disease patients with and without hemodialysis

Devendra Singh Kushwaha<sup>1</sup>, Sushma Trikha<sup>2</sup>, Neelima Singh<sup>3\*</sup>, Kanika Sethi<sup>4</sup>

<sup>1</sup>PG Resident, Department of Medicine, Gajraraja Medical College, Gwalior, M.P., India

<sup>2</sup>Professor, Department of Medicine, Gajraraja Medical College, Gwalior, M.P., India

<sup>3</sup>Associate Professor, Department of Medicine, Gajraraja Medical College, Gwalior, M.P., India

<sup>4</sup>PG Resident, Department of Medicine, Gajraraja Medical College, Gwalior, M.P., India

Received: 08-06-2021 / Revised: 13-08-2021 / Accepted: 27-09-2021

### Abstract

**Background & Method:** The present study is comparative observational study; entitled - To compare the clinical parameters and lipid profile in chronic kidney disease patients with and without hemodialysis has been conducted in the Department of Medicine in Jaya Arogya Hospital, Gwalior on an inpatient basis. All the selected patients were subjected to relevant investigations like CBC, Blood urea, Serum creatinine, total protein, serum albumin, serum electrolytes, serum bilirubin, SGPT, Blood Sugar, lipid profile, Urine Routine and Microscopy test and USG abdomen. **Result:** Among the studied 100 patients, maximum cases belonged to the age group 41-50 years (n=29). Out of studied 100 patients, 67 were male and 33 were female. In our study, most common clinical sign was pallor (found in 76% patients), and most common clinical symptom was oliguria (70%), followed by swelling of legs and edema (69% each), while facial puffiness and breathlessness was found in 48% and 45% patients respectively. On comparing the value of triglyceride and VLDL the value were found to be higher in Chronic kidney disease (CKD) patients with hemodialysis than CKD patients without hemodialysis which was statistically significant with p value <0.00001 (each). The value of HDL was lower CKD patients with hemodialysis than CKD patients without hemodialysis which was statistically significant with p value of 0.00672. Total cholesterol and LDL were also marginally raised in CKD patients with hemodialysis than CKD patients without hemodialysis. But this difference was not statistically significant with p value of 0.1723 and .09938 respectively. **Conclusion:** Hemodialysis effectively reduced the accumulation nitrogenous waste product but fails to correct uremic dyslipidemia completely rather it may alter the pattern of dyslipidemia as seen in our study. The value of triglyceride (TG) and VLDL value were higher while the value of HDL was lower in CKD patients with hemodialysis than CKD patients without hemodialysis which were statistically significant (p value <0.05). Total cholesterol and LDL were also marginally raised in patients of CKD with hemodialysis than CKD patients without hemodialysis, but this was not found to be statistically significant (p value >0.05). Dyslipidemia, being modifiable risk factor, becomes an important component in the management of CKD patients. A strict monitoring of lipid profile can reduce the morbidity and mortality in these patients and will also improve the quality of life of patients of ESRD and use the lipid lowering agents in patients of dyslipidemia as per guidelines for improving cardiovascular outcome.

**Keywords:** Chronic Kidney Disease, Lipid profile, Dyslipidemia, Hemodialysis.

This is an Open Access article that uses a fund-ing model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Chronic kidney disease (CKD) is a syndrome of persistent renal impairment involving loss of both glomerular and tubular function. The Global Burden of Disease study 2015 ranked chronic kidney disease as 17th among the cause of deaths globally (Age-standardized annual death rate of 19.2 deaths per 100,000 population)[1]. The estimated prevalence of CKD in India is up to 785 people per million populations[2]. Because of challenges in access to care, over 50% of patients with advanced CKD are first seen when the eGFR is <15 ml/min per 1.73 m<sup>2</sup>. The mortality with pre dialysis CKD which is predominantly cardiovascular is up to 5.4 times higher compared with general population with estimated GFR within normal range[3]. CKD is defined as abnormalities of kidney structure or function, present for ≥3 months, with implications for health and CKD is classified based on cause, GFR category, and albuminuria category[4].

Dyslipidemia, as a traditional cardiovascular risk factor, is an important "criminal" of atherosclerotic diseases in the general population[5]. Large-scale observational studies have shown that Total cholesterol (TC) and Low Density Lipoprotein (LDL) cholesterol are most important independent predictors of cardiovascular morbidity and mortality[6].

Several prospective studies suggest that lipid abnormalities principally present in CKD is hypertriglyceridemia. Impaired activity of lipoprotein Lipase (LPL) and direct inhibitory effect of various uremic toxins on the enzymes involved in lipid metabolism, represents the most important pathophysiological mechanisms underlying the development of hypertriglyceridemia in renal failure[7].

The growing prevalence of obesity and metabolic syndrome in India, the complex relation of both the conditions with CKD and their association with cardiovascular disease risk underlines the importance of lipid Profile and other related factors in CKD patient population.

Cardiovascular disease constitutes the major cause of death in patients with ESRD and it is still higher in dialysis patients than in post transplantation patients due to abnormalities in lipids and lipoproteins structure and metabolism[8].

\*Correspondence

**Dr. Neelima Singh**

Associate Professor, Department of Medicine, Gajraraja Medical College, Gwalior, Madhya Pradesh., India

E-mail: [neelimajadon89@gmail.com](mailto:neelimajadon89@gmail.com)

**Material & Method**

The present study is comparative observational study; entitled - To compare the clinical parameters and lipid profile in chronic kidney disease patients with and without hemodialysis from May 2019 to October 2020, has been conducted in the Department of Medicine in Jaya Arogya Hospital, Gwalior on an inpatient basis.

In all the cases written informed consent was obtained from each subject and detailed clinical history including complaints, past history, personal history, family history was taken. All the selected patients were subjected to relevant investigations like CBC, Blood urea, Serum creatinine, total protein, serum albumin, serum electrolytes, serum bilirubin, SGPT, Blood Sugar, lipid profile, Urine Routine and Microscopy test and USG abdomen.

**Inclusion criteria**

1. Age more than 20 years.
2. Cases fulfilling the criteria of Chronic Kidney Disease (CKD).
3. Cases of Chronic Kidney Disease (CKD) undergoing Hemodialysis.

**Exclusion criteria**

1. Age below and equal 20 years.
2. Cases known for suffering from Dyslipidemia prior to onset of CKD.
3. Documented or detected cases of Acute Renal Failure, Coronary Artery Disease, Ischemic Heart Disease, Cerebrovascular Disease.
4. Those taking drugs that affect lipids and lipoproteins level.
5. Subjects who give negative consent for the study.

**Results****Table 1 : Age and Gender wise distribution of CKD patients with and without hemodialysis**

Age group (years)	Total No. of patients (100)	Group 1 (n=50) CKD patients without hemodialysis		Group 2 (n=50) CKD patients with hemodialysis	
		No.	%	No.	%
21 – 30	21	10	20	11	22
31 – 40	21	11	22	10	20
41 – 50	29	14	28	15	30
51 – 60	21	10	20	11	22
61 – 70	08	5	10	3	6
Mean Age		44.26±12.76		42.62±12.43	
<b>Gender</b>					
Male	67	34	68	33	66
Female	33	16	32	17	34
Total	100	50	100	50	100

**Table 2 : Clinical Parameters of CKD patients with and without hemodialysis**

Clinical Feature	Total No. of patients (100)	Group 1 (n=50) CKD patients without hemodialysis		Group 2 (n=50) CKD patients with hemodialysis	
		No.	%	No.	%
Puffiness of Face	69	27	54	21	42
Swelling of Legs	48	36	72	33	66
Oliguria	70	32	64	38	76
Breathlessness	45	21	42	24	48
Anorexia	65	31	62	34	68
Pallor	76	35	70	41	82
Edema	69	36	72	33	66
<b>Co-morbid illness</b>					
Hypertension	78	36	72	42	84
Diabetes Mellitus	45	21	42	24	48
Obesity	14	08	16	06	12

**Table 3: Lipid profile among CKD patients with and without hemodialysis**

Parameters	Group 1 (n=50) CKD patients without hemodialysis		Group 2 (n=50) CKD patients with hemodialysis		t value	p Value
	Range	Mean ± SD	Range	Mean ± SD		
TC	94-250	153.6±34.88	98-260	160.28±35.38	-0.949	.1723
TG	60-328	139.68±55.75	114-317	187.62±37.65	-5.03855	<0.00001
HDL	16-53	32.6±8.0	20-38	29.08±5.78	2.51754	0.00672
LDL	65-178	100.68±25.43	46-190	108.11±31.83	-1.29384	.09938
VLDL	11-65.6	25.5±11.8	14-63	36.48±11.08	-4.7977	<0.00001

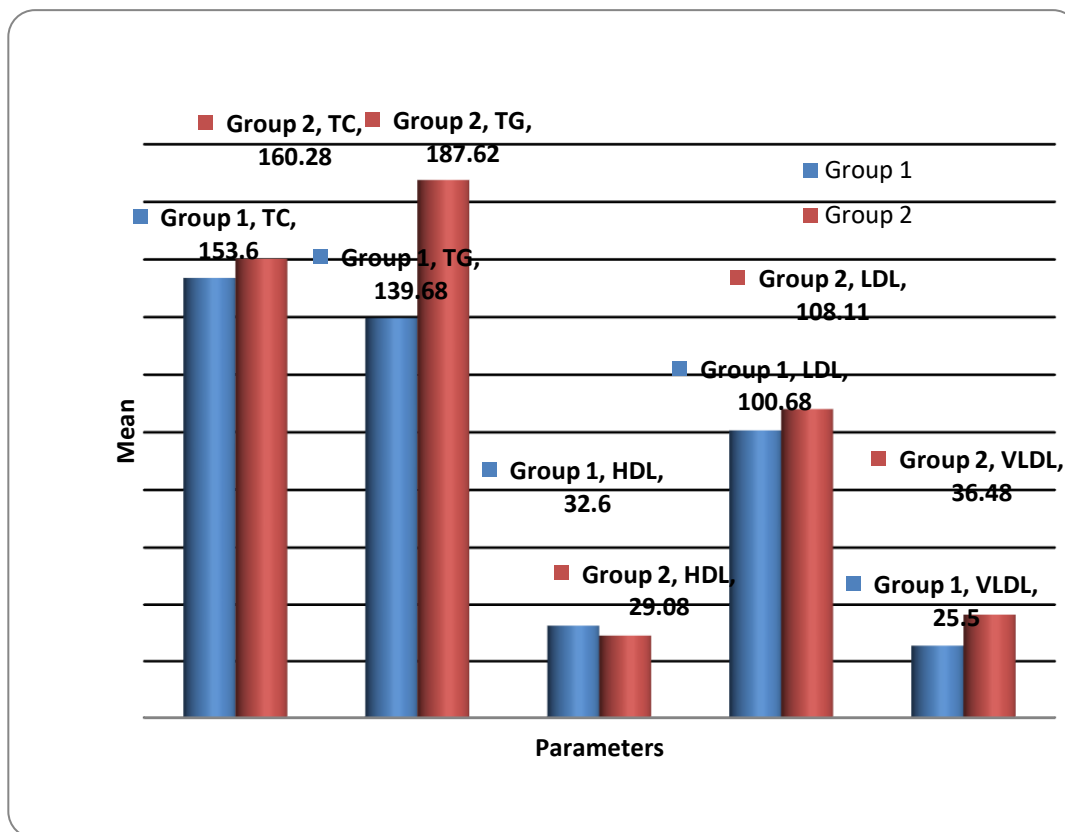


Fig 1:Lipid profile among CKD Patients with and without hemodialysis

#### Discussion

In our study, of 100 patients, mean age was  $43.44 \pm 12.56$  years. Maximum patients belonged to age group 41-50 years ( $n=29$ ). Mean age in our study was comparable to ManjushaYadla et al[9] ( $44.7 \pm 12.3$  years), Ajankar et al[10] ( $45.92 \pm 10.14$  years), K Rajnikumari et al[11] ( $45.28$  years).

Slight higher mean age were seen in study of Bignotto et al[12] i.e.  $58.5 \pm 14.7$  years and Sachdeva et al[13] i.e.  $58.62 \pm 13.7$  years.

Mean age in CKD patients without hemodialysis was  $44.26 \pm 12.76$  and CKD patients on hemodialysis  $42.62 \pm 12.43$  years which was comparable to Magar S et al[14] mean age  $43.45 \pm 10.33$  in CKD patients without hemodialysis patients and  $46.67 \pm 11.34$  in CKD patients with hemodialysis.

#### Gender distribution

In the studied population, 67 were males and 33 were females. Male female ratio is  $\approx 2:1$  which was comparable to following studies:

Rajnikumari et al[11] – Male female ratio  $\approx 2:1$

Sachdeva et al[13] - Male female ratio  $\approx 3:1$

Magar S et al[14] – Male female ratio 1.5:1

Among the studied 100 patients, most common co-morbid condition was hypertension (78%) followed by diabetes mellitus (45%) and obesity (14%). Hypertension was found in 78% of CKD patients in study by Rajnikumari et al[11]. Similarly, Shafi S et al[15] reported that among CKD patient, 84.8% had hypertension and 7% had diabetes mellitus.

In our study, most common clinical sign was pallor (76%) and most common clinical symptom was oliguria (70%) followed by swelling of legs and edema (69%) and anorexia (65%) while facial puffiness and breathlessness were found in 48% and 45% respectively. Similar findings were observed by Prasad RYS et al.[16]

Among CKD patients without hemodialysis, most common clinical symptoms was swelling of legs/edema (72%) and most common clinical sign was pallor (70%) followed by oliguria (64%).

Among CKD patients with hemodialysis, most common clinical symptom oliguria (76%) followed by anorexia (68%) and most common clinical sign was pallor (82%).

In our study triglyceride ranged from 114-317 in CKD patients with hemodialysis, 60-328 in CKD patients without hemodialysis. The mean value of triglyceride was markedly higher in CKD patients with hemodialysis than in CKD patients without hemodialysis i.e.  $187.62 \pm 37.65$  mg/dl vs  $139.68 \pm 55.75$  mg/dl ( $p$  value  $< 0.00001$ ).

The value of VLDL in our study ranged from 14-63 mg/dl on CKD patients with hemodialysis, 11-65.6 mg/dl CKD patients without hemodialysis. The mean value of VLDL was higher in CKD patients with hemodialysis than CKD patients without hemodialysis i.e.  $36.48 \pm 11.08$  mg/dl vs  $25.5 \pm 11.8$  mg/dl ( $p$  value = 0.00001).

The value of HDL in our study ranged from 16-53 mg/dl in CKD patients without hemodialysis and 20-38 mg/dl patients on hemodialysis and the mean value of HDL was lower in CKD patients with hemodialysis than CKD patients without hemodialysis i.e.  $29.08 \pm 5.78$  mg/dl vs  $32.6 \pm 8.0$  mg/dl ( $p=0.00672$ ).

In our study, total cholesterol value ranged from 98-260 mg/dl in CKD patients with hemodialysis and 94-250 mg/dl in CKD patients without hemodialysis. Mean value was slightly higher in CKD patients with hemodialysis as compared to CKD patients without hemodialysis ( $160.28 \pm 35.38$  mg/dl vs  $153.6 \pm 34.88$  mg/dl) but this was not statistically significant ( $p=0.1723$ ).

In our study, LDL cholesterol value ranged from 46-190 mg/dl in CKD patients with hemodialysis and 65-178 mg/dl in CKD patients without hemodialysis. The mean value of LDL slightly higher in CKD patients with hemodialysis than CKD patients without hemodialysis

(108.11±31.83mg/dl vs 100.68±25.43mg/dl) but this was not statistically significant (p=0.09938).

These findings were consistent with Magar S et al[14] and Rajni Kumari et al.[11]

Neelesh et al[17] observed the higher value of total cholesterol, triglyceride, LDL and VLDL and lower value of value of HDL in CKD patients on regular hemodialysis as compared to CKD patients on irregular hemodialysis. All of which were found to be statistically significant in his study.

### Conclusion

Hemodialysis effectively reduced the accumulation nitrogenous waste product but fails to correct uremic dyslipidemia completely rather it may alter the pattern of dyslipidemia as seen in our study. The value of triglyceride(TG) and VLDL value were higher while the value of HDL was lower in CKD patients with hemodialysis than CKD patients without hemodialysis which were statistically significant (p value <0.05). Total cholesterol and LDL were also marginally raised in patients of CKD on hemodialysis than CKD patients without hemodialysis, but this was not found to be statistically significant (p value >0.05). Both groups of chronic kidney disease patients had significant alterations in the lipid profile.

Dyslipidemia, being modifiable risk factor, becomes an important component in the management of CKD patients. Therefore, strict monitoring of lipid profile is recommended which can reduce the morbidity and mortality in these patients and will also improve the quality of life of patients of ESRD. We should use the lipid lowering agents in patients of dyslipidemia as per guidelines for improving cardiovascular outcome.

### References

1. Wang H, Naghavi M, Allen C, Barber R, Bhutta Z, Carter A, et al. A systematic analysis for the Global Burden of Disease Study 2015. *Lancet*. 2019. Global, regional and national life expectancy, all-cause mortality and cause-specific mortality for 249 causes of death, 1980–2015.
2. Latha KM, Varma BA, Pre and Post Dialysis Variations in Serum Lipid Profile among End Stage Renal Disease Patients. *Journal of Clinical and Diagnostic Research* 2018 Sep;12(9): BC05-BC09.
3. Banerjee D, Recio-Mayoral A, Chitalia N, Kaski JC. Insulin resistance, Inflammation, and vascular disease in non-diabetic pre-dialysis chronic kidney patients. *Clin Cardiol*. 2011 Jun;34(6):360-5.
4. Kerry Willis, Michael Cheung, Sean Slifer, et al. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. *Kidney International Supplements*. 2013; 3: 19–62.
5. Bakkaloglu SA, Ekim M, Tumer N, Soylu K. The effect of CAPD on the lipid profile of pediatric patients. *Perit Dial Int*. 2000;20(5):568-71.
6. Lewington S, Whitlock G, Clarke R, Sherlinker P, Emberson J, Halsey J, et al. Blood cholesterol and vascular mortality by age, sex and blood pressure a meta-analysis of individual data from 61 prospective studies with 55,000 vascular deaths. *Lancet*. 2007 Dec 1;370(9602):1829-39.
7. Cheung AK, Parker CJ, Ren K, Iverius PH. Increased lipase inhibition in uremia: Identification of pre-beta HDL as a major inhibitor in normal and uremic plasma. *Kidney Int*. 1996 May;49(5):1360-7.
8. Reiner Z, Catapano AL, De Backer G, Graham I, Taskinen MR, Wiklund O, et al. ESC/EAS Guidelines for the management of dyslipidaemias: the Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and the European Atherosclerosis Society (EAS). *Eur Heart J* 2011; 32: 1769–1818.
9. Yadla M, Poosa K. Resting ECG abnormalities in patients on maintenance hemodialysis – A clinical study. *Journal of Dental and Medical Sciences* 2017;16(8):62-64.
10. Anjankar AP, Dharme PV, Anjankar VP. Study of comparative effect of hemodialysis and peritoneal dialysis on lipid profile on patients of chronic kidney disease. *Asian Journal of Biomedical and Pharmaceutical Sciences* 2014;4(36):30-34.
11. Kumari KR, Srinivas B. Study of lipid profile in patients with chronic kidney disease on conservative management of hemodialysis. *Int J Sci Stud* 2018;6(7):108-13.
12. Bignotto LH, Kallas ME, Djouki RJT. Electrocardiographic findings in chronic hemodialysis patients. *Journal Brasileiro de Nefrologia* 2012;34(3):235-42.
13. Sachdeva S, Khurana T, Kaur S, Kamalpreet, Aggarwal R, Kaur A, Singh B. ECG and ECHO changes in CKD. *Annals of International Medical and Dental Research* 2017;3(5):10-14.
14. Magar LRS, Mohammad AM, Anil SS. A study of lipid profile in chronic renal failure patients undergoing hemodialysis. *Journal of Dental and Medical Sciences* 2016;15(6):1-3.
15. Salman Shafi, Mohammad Saleem, Roshina Anjum, Wajid Abdullah, Tahir Shafi. ECG Abnormalities In Patients With Chronic Kidney Disease. *J Ayub Med Coll Abbottabad* 2017; 29(1):61–4.
16. Prasad YSR, Murthy KHA. Clinical and biochemical spectrum of chronic kidney disease in tertiary care center. *JEMDS*, 2012 Dec;1(6):1214-22.
17. Maurya NK, Sengar NS, Arya P. Impact of hemodialysis on lipid profile among chronic renal failure patients (Regular and Non-Regular haemodialysis). *The Pharma Innovation Journal* 2018;7(4):363-365.

**Conflict of Interest: Nil Source of support: Nil**