



ORIGINAL RESEARCH PAPER

General Medicine

STUDY OF LIPID PROFILE IN PATIENTS WITH CHRONIC KIDNEY DISEASE

KEY WORDS:

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ABSTRACT

Background: Chronic kidney disease (CKD), an inevitable terminal event of chronic renal parenchymal disease, due to various causes is known more for its morbidity than for its mortality.
Aim: To study the lipid profile in patients with chronic kidney disease
Materials and methods: It was a hospital-based study done on patient admitted and diagnosed with CKD in Jhalawar medical college, Jhalawar from Dec. 2019 to Aug. 2020. The history of the onset, progression, duration of various symptoms, drug and diet history was noted. The patients were clinically examined for signs of hyperlipidemia. Laboratory investigations like basic blood profile, blood urea, serum creatinine, serum cholesterol, serum triglyceride, serum LDL, serum HDL and ultrasound abdomen were done.
Results: Mean Total Cholesterol, triglyceride levels, LDL levels are significantly increased whereas mean HDL levels are significantly decreased in CKD patients both in conservative and hemodialysis group. Total cholesterol to HDL cholesterol ratio is significantly increased in CKD patients. There is no significant difference in the lipid profile between males and females in the different groups except for triglyceride level in conservative group.
Conclusion: Dyslipidaemia and its complications are more prevalent in chronic kidney disease patients, early diagnosis of dyslipidaemia is indicated and potential therapeutic approaches (therapeutic life style changes and pharmacotherapy) should be initiated.

INTRODUCTION

Chronic kidney disease (CKD), an inevitable terminal event of chronic renal parenchymal disease, due to various causes is known more for its morbidity than for its mortality. Cardiovascular disease is a major cause of mortality and morbidity among patients with CKD. More than 50 percent of patients with CKD die due to cardiovascular complications¹. In recent times, dyslipidemia has been identified as a major risk factor for coronary artery disease². This has renewed interest in the identification and management of abnormalities in the plasma lipids and lipoproteins². An association between lipids and kidney disease was first noted by Virchow³ who described fatty degeneration of renal epithelium in Bright's disease in 1860. The magnitude of the problem has become more apparent in the recent years as a result of an increase in the life span of the patients due to the advent of hemodialysis. The incidence of coronary artery disease is seen in 26 percent of dialysis patients⁴.

MATERIALS AND METHODS

It was a hospital-based study done on patient admitted and diagnosed with CKD in Jhalawar medical college, Jhalawar from Dec. 2019 to Aug. 2020. Patients presenting to the hospital and diagnosed with CKD were included in the study after obtaining informed consent until 120 cases were collected. The history of the onset, progression, duration of various symptoms, drug and diet history was noted. The patients were clinically examined for signs of hyperlipidemia. Laboratory investigations like basic blood profile, blood urea, serum creatinine, serum cholesterol, serum triglyceride, serum LDL, serum HDL and ultrasound abdomen was done. All the data was compiled and analyzed by SPSS software.

RESULTS

Among the 120 patients included in this study 72% were male and 28% were females. The male to female ratio was 2.5:1. The study sample included majority 31.7 percent of the patients in the age group of 55-64 years followed by 22 percent in the age group of 50-59 years (Table 1). The study group was analyzed with the risk factors associated with increased cardiovascular mortality. It was found that patients with diabetes comprised

65 percent of the study population while the remaining 35 percent were non diabetic. Among the 120 patients included in the study 68 percent (82 patients) had hypertension as a co morbid condition. In this study population only 40 patients were on hemodialysis while the remaining 80 patients were managed conservatively.

Table 1 Age in years

Age Group	No. of patients	Percent
25-34	14	11.7
35-44	6	5
45-54	22	18.3
55-64	38	31.7
65-74	26	21.7
75-84	14	11.7
Total	120	100

Table 2 --: Serum Total cholesterol in Different groups with their comparison

Group	No. of cases	Mean	P value	Significance
Conservative	80	158.5	< 0.001	Significant
Haemodialysis	40	147.3	< 0.001	Significant
Control	120	126.6		

TOTAL CHOLESTEROL

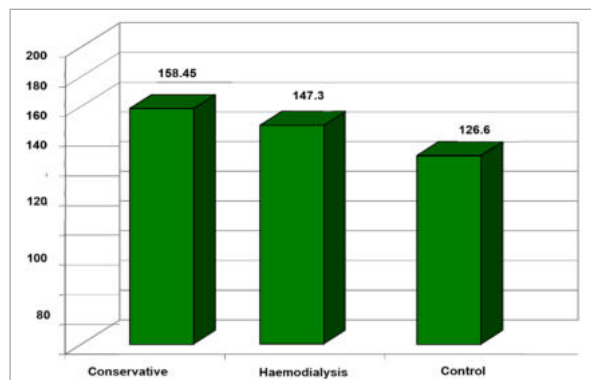


Table - 3: Serum triglyceride in Different groups with their comparison

Group	No. of cases	Mean	P value	Significance
Conservative	80	153.55	< 0.001	Significant
Haemodialysis	40	161.8	< 0.001	Significant
Control	120	120.25		

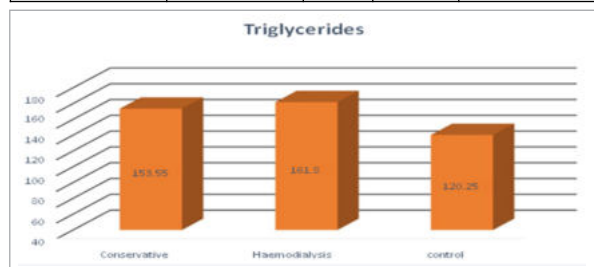


Table - 4: Serum LDL in Different groups with their comparison

Group	No. of cases	Mean	P value	Significance
Conservative	80	92.35	< 0.001	Significant
Haemodialysis	40	78.8	< 0.001	Significant
Control	120	58.9		

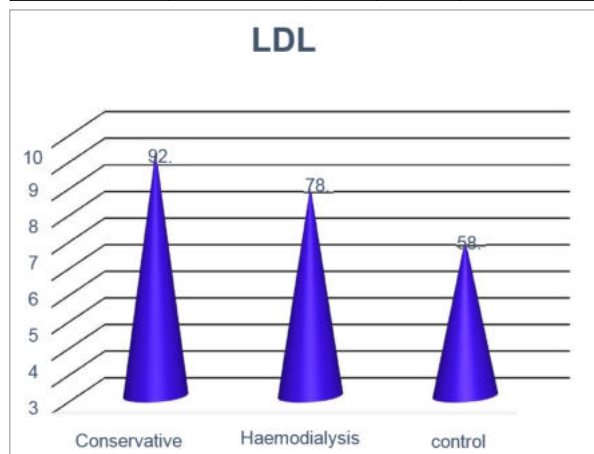


Table - 5: Serum HDL in Different groups with their comparison

Group	No. of cases	Mean	P value	Significance
Conservative	80	36.3	< 0.001	Significant
Haemodialysis	40	36.15	< 0.001	Significant
Control	120	43.7		

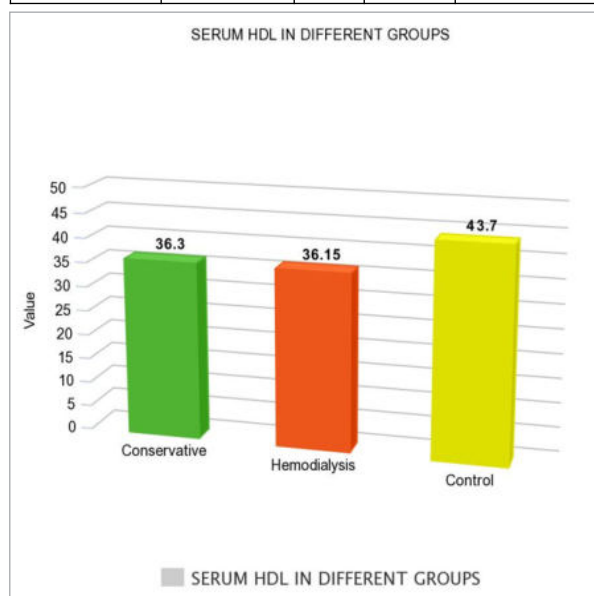
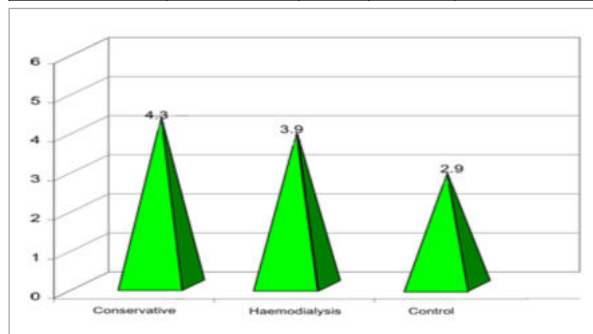
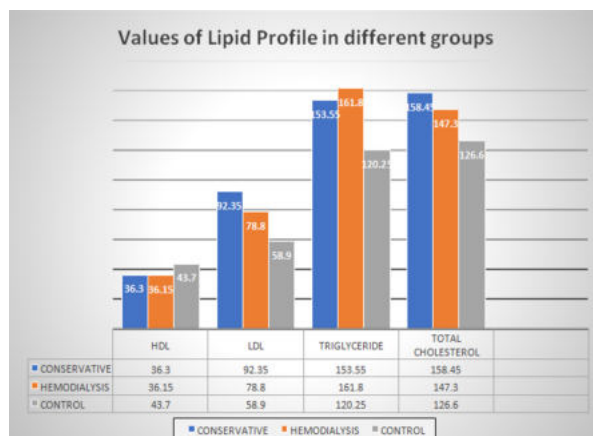


Table - 6: Total cholesterol / HDL ratio in Different groups with their comparison

Group	No. of cases	Mean	P value	Significance
Conservative	80	4.3	< 0.001	Significant
Haemodialysis	40	3.9	< 0.001	Significant
Control	120	2.9		



Total Cholesterol / HDL ratio



DISCUSSION

The results were statistically analysed based on the following guidelines.

DYSLIPIDEMIA Total cholesterol	
LEVEL (mg /dl)	
Desirable	< 200
Borderline high	200-239
High	> 240
LDL cholesterol	
Optimal	< 100
Near optimal	100-129
Borderline	130-159
High	> 160
Triglycerides	
Normal	< 150
Borderline high	150 - 199
High	200-499
Very high	> 500
HDL cholesterol	
Low	< 40

Lipid changes in CKD patient on conservative management The final results revealed a

- (1) significant decrease in HDL cholesterol
- (2) significant increase in triglyceride levels
- (3) significant increase in TC/HDL cholesterol ratio
- (4) significant increase in serum total cholesterol and LDL cholesterol when compared to the control group.

The significant decrease in HDL could be due to various reasons (decrease in LCAT, hepatic lipase activity, increase in ACAT, decrease in apo-AI and apo-AII) and the cause for hypertriglyceridemia is impaired carbohydrate tolerance leading to increased hepatic synthesis of VLDL and

decreased activity of lipoprotein lipase and hepatic triglyceride lipase leading to decreased fractional catabolic rate of triglycerides.

In a study by Attman PO et al⁵ revealed increased VLDL; remnants and intermediate density lipoproteins; prolonged persistence of postprandial chylomicrons and accumulation of non-cardioprotective acute phase HDL in renal disease patients. Another study by Bagdade, Casaretto A, Albers J showed the same effects of chronic uraemia on lipid profile.⁶

Lipid changes in CKD patient on Hemodialysis

The final results revealed a

- (1) significant decrease in HDL cholesterol
- (2) significant increase in triglyceride levels
- (3) significant increase in TC/HDL cholesterol ratio
- (4) significant changes in serum total cholesterol and LDL

A study by Deighan CJ, Caslake MJ, McConnel revealed the same lipid changes in dialysis patients. Shoji T, and Huttunen JK tested the role of heparin in the pathogenesis of HD induced dyslipidaemia revealed the same changes^{6,7}. But According to ATP III guidelines 55.7% would require treatment based on LDL >100.

From this study it is inferred that dyslipidaemias are common in chronic renal failure patients and especially more pronounced in transplant recipients.

The National Kidney Foundation task force on CVD (Cardiovascular disease) concluded that the incidence of ACVD is higher in patients with CKD compared to the general population. The task force concluded that patients with CKD should be considered to be in the highest risk category, i.e., a CHD (Coronary heart disease) risk equivalent, for risk factor management. The principal reason to evaluate dyslipidaemias in patients with CKD is to detect abnormalities that may be treated to reduce the incidence of ACVD (Atherosclerotic Cardiovascular Disease). The appropriate management of dyslipidaemia plays an important role in the overall care of the patient with chronic and ESRD. Evaluation of dyslipidaemias should occur at presentation with chronic renal disease, following a change in treatment modality and annually. Appropriate therapeutic life style change and drug therapy should be started. LDL level should be maintained below 100mg/dl, Triglycerides below 150 mg/dl and HDL should be above 40 mg/dl. Drug therapy should be used for LDL levels of 130 mg/dl and also for LDL levels of 100- 129 mg/dl after 3 months of therapeutic life style change.

SUMMARY AND CONCLUSION

- There is no significant difference in the lipid profile between males and females in the different groups except for triglyceride level in conservative group.
- The mean total cholesterol is significantly increased in chronic kidney disease patients on conservative group and on haemodialysis group when compared to controls (p<0.001).
- The mean triglyceride level is significantly increased in CKD patients on conservative management (p<0.001) and on haemodialysis (p<0.001). According to ATP III guidelines the mean triglycerides is high (150-199) in the conservative and haemodialysis group.
- The mean LDL cholesterol is significantly increased in the haemodialysis group and conservative group.
- The mean HDL cholesterol is significantly decreased in the conservative management group (p<0.001) and the haemodialysis group (p<0.001).
- The total cholesterol to HDL cholesterol ratio is significantly increased in CKD patients on conservative management (p<0.001) and on haemodialysis (p<0.001).

Dyslipidaemia is a very common complication of CKD. Disturbances in lipoprotein metabolism usually follow a

downhill course that parallels the deterioration in renal function. The lipoprotein abnormalities caused by renal insufficiency also may further influence the progression of renal failure. Since dyslipidaemia and its complications are more prevalent in chronic kidney disease patients, early diagnosis of dyslipidaemia is indicated and potential therapeutic approaches (therapeutic life style changes and pharmacotherapy) should be initiated.

REFERENCES

1. Ma King W, Green EL, Raji L. Cardiovascular risk factors in chronic renal failure and haemodialysis populations. *Am J of Kidney diseases* 1992; 19(6): 505-15.
2. Grundy SM. Cholesterol and coronary heart disease: A new era. *JAMA* 1986; 256:2849-58.
3. Majumdar A, Wheeler DC. Lipid abnormalities in renal disease. *J.R. Soc Med* 2000; 93: 178-82.
4. Gokal RJ. Outcome in patients on continuous ambulatory peritoneal dialysis and haemodialysis. *Lancet* 1987; 14: 1105-9.
5. Bagdade J, Casaretto A, Albers J. Effects of chronic uraemia, haemodialysis and renal transplantation on plasma lipids *J Lab Clin Med* 87;38-48, 1976.
6. 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.
7. Huttunen JK, Pasternack A, Vanttinen T, Ehnholm C, Nikkila EA. Lipoprotein metabolism in patients with chronic uraemia. Effect of haemodialysis on serum lipoproteins and post-heparin plasma triglyceride lipases. *Acta Med Scand* 1978; 204:211-8.