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HYPERLIPIDEMIA AS A PREDICTOR FOR EVALUATION OF CARDIOVASCULAR RISK IN CHRONIC KIDNEY DISEASE PATIENTS

Ganji Komali[1]*, Golla Supriya[1], Ede. Sri Lakshmi[1], Natta Prathibha[2] and Kantamaneni Padmalatha[3]

[1]Pharm. D V Year, Department of Pharmacy Practice, Vijaya Institute of Pharmaceutical Sciences for Women, Enikepadu, Vijayawada – 521108.

[2]Assistant Professor, Department of Pharmacy Practice, Vijaya Institute of Pharmaceutical Sciences for Women, Enikepadu, Vijayawada – 521108, Andhra Pradesh, India.

[3]Professor and Principal, Department of Pharmacology, Vijaya Institute of Pharmaceutical Sciences for Women, Enikepadu, Vijayawada – 521108, Andhra Pradesh, India.

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***Corresponding Author**
Ganji Komali
Pharm. D V Year,
Department of Pharmacy Practice, Vijaya Institute of Pharmaceutical Sciences for Women, Enikepadu, Vijayawada – 521108.

ABSTRACT

Dyslipidemia is a potential risk factor for to access cardiovascular disease in chronic kidney disease patients. It promotes the identification and treatment of hyperlipidemia as a symptom of end-stage renal disease. Different phases of renal impairment are characterized by various qualitative and quantitative alterations, which are linked to the rate of glomerular filtration rate decline. Elevation of serum lipoproteins like total cholesterol, triglycerides, and low-density lipoprotein and decrease of high-density lipoprotein shortage and their atypical functions in chronic kidney disease patients as the major problem of atherosclerosis. So that studying the lipid profile in renal disease patients is essential to preventing morbidity and death because dyslipidemia, which is quite common in individuals with the condition, causes cardiovascular disease the most common cause of mortality. So strictly monitoring the lipid profiles along with regular hemodialysis and proper medical management will help to prevent various complications and will also improve the quality of life in CKD patients.

KEYWORDS: Dyslipidemia, Cardiovascular, Chronic Kidney Disease, End stage renal disease.

INTRODUCTION

Chronic kidney disease is a major health problem as it results in a reduced glomerular filtration rate and hence it causes chronic renal dysfunction to have more prone to cardiovascular disease.[1,2,10] The growing realization that dyslipidemia must be a significant contributor to the development of coronary heart disease encourages the detection and treatment of abnormalities in plasma lipid and lipoprotein levels with a high proportion of the Total Cholesterol (TC), Triglycerides (TG), Very low-density lipoprotein (VLDL), Low-density lipoprotein levels and reduce High-density lipoprotein (HDL) insufficiency and their abnormalities functions in CKD patients.[1,9] Dyslipidemia is very common in patients receiving maintenance hemodialysis.[1,7] Invariably is linked with several complications due to lower levels of kidney functions for a long period.[3] These complications contribute to high fatality, death, and poor quality of life. Among these complications, cardiovascular diseases (CVD) play a major role and it is reported by previous researchers that the risk of mortality from CVD is 8.1-fold greater in a patient with end-stage renal disease patients than in an experimental group without kidney disease.[3] Dyslipidemia and impaired glucose tolerance are among the contributors to increased cardiovascular risk.[3,5] Dyslipidemia may harm podocytes mesangial and endothelial cells in glomerular capillaries mesangial sclerosis brought on by podocyte damage is also linked to hypercholesterolemia and hypertriglyceridemia. The leading cause of death in patients with end-stage renal disease is cardiovascular disease.[2] Renal function declines in linked to a particular lipid profile change. Hence careful lipid profile monitoring is necessary during chronic kidney disease treatment to prevent numerous side effects and will also enhance the quality of life for CKD patients.[4]

DISCUSSION

Study-01: Preeti Kumari and Mithilesh Kumar Singh *et al.*, (2020): The study was conducted on 50 chronic kidney disease patients, and 50 age, sex-normal individuals were selected. In our study, individuals with CKD had higher blood levels of urea and creatinine than the control group. The glomerular filtration rate was reduced, which elevated the serum level of these analyses. The results demonstrate that the lipid profiles of CKD patients have been dramatically altered in the serum levels of cholesterol, triglycerides, and VLDL although elevated plasma LDL cholesterol is frequent in the nephrotic syndrome, it is not typically present in patients with severe CKD. In contrast, patients with CKD had decreased amounts of serum HDL. The increased rate of atherosclerosis in the renal microcirculation as well as increased lipoprotein in the glomerular apparatus, which in turn increases

inflammatory mediators and aids in fibrogenesis, are the pathophysiological bases for dyslipidemia in CKD.

Study-02: *Deepak Jain, H.K.Aggarwal, et al.,* (2019): The study comprises 150 adult patients with chronic kidney disease and were divided into groups. In 1st group of 50 patients with eGFR -30-59ml/min, In 2nd group of 50 patients with eGFR 15-29 ml/min, and in 3rd group of 50 patients <15ml/min. Samples were to be collected in the morning with overnight fasting to analyze biochemical parameters in blood and plasma. In this study, 37% of the patients had hypertriglyceridemia, 36% had hypercholesterolemia, 36% had low HDL, 36% had high LDL, and 36% had high VLDL. From CKD stage 3 to 5, there was a large increase in LDL and VLDL and a considerable drop in HDL. It is well-recognized that dyslipidemia raises the chance of developing cardiovascular disease. Patients with CKD are at greater risk of getting CVD compared to the general population. This study went into detail about the significance of dyslipidemia in CKD. The fact that LDL and VLDL levels significantly increased and HDL levels significantly decreased from stages 3 to 5 implies that dyslipidemia is a common consequence of CKD and is linked to an increased risk of CVD and the progression of renal disease. There is a relation between the degree of renal impairment and the severity of dyslipidemia. Early diagnosis and treatment of dyslipidemia in CKD patients will help to stop the disease from progressing and reduce the study risk of CVD outcomes and death.

Study-03: Dr. Saritha H Patel, Dr. Milav Bhavsar, *et al.,* (2019) During the study, 100 subjects were considered of them, 50 participants with CKD and 50 participants from the general population. Participants in the 21 to 70 age range had a total of 50 instances with lipid levels such as TC, TG, LDL, and VLDL, with 31 (62%) male participants and 19 (38%) female patients. Total cholesterol and LDL were statistically significantly higher in CKD patients as compared to the control group; the p-values for serum triglyceride, cholesterol, HDL, and LDL are 0.43, 0.43, 0.049, and 0.016, respectively. The HDL and VLDL lipoprotein fraction levels were within the normal range, and the mean p values were judged to be negligible.

Study-04: Neelakanth U. Parappanavar, A.K. Pathak, Sandeep Singh, *et al.*, (2019): During this study 150 participants that divided into 3 groups. In 1st group, 50 participants are health group, in 2nd group 50 participants are CKD patients, and in 3rd group, CKD patients

are on hemodialysis. In patients with CKD receiving hemodialysis, there is a statistically significant rise in serum triglyceride and LDL levels with an increase in the stage. It has been discovered that there is a statistically significant rise in VLDL with an increase in the stage in CKD patients without hemodialysis. In diabetic CKD patients compared to non-diabetic CKD patients, there is a statistically significant rise in TC, TG, and VLDL (p0.05). In contrast to CKD patients without hemodialysis, TG and VLDL levels are higher and HDL levels are lower in CKD patients receiving hemodialysis. Each parameter has a p-value of 0.05. In CKD patients, lower HDL-C levels and raised TGL and VLDL levels were the most prevalent lipid abnormalities.

Study-05: Duminda B. Basnayake, W.G.H. Sandamali, *et al.*, (2019): This study was carried out in Sri Lanka on 168 cases of chronic kidney disease, and the data collected showed that glomerular filtration decreases with several complications due to lower levels of kidney function over time. They may cause cardiovascular disease due to hypercholesteremia, which causes an abnormal lipid profile with low HDL and a higher amount of TG, TC, VLDL, and LDL. Cardiovascular disease (CVD) is well-known to be linked with CKD and is a major cause of morbidity and mortality. There are several known risk factors for atherogenesis and CVD in CKD patients. Uremia, anemia, dyslipidemia, chronic inflammation, oxidative stress, malnutrition, hypertension, hyperphosphatemia, and hypocalcemia all result in atherogenesis and endothelial dysfunction. In this study, 18% of patients had high cholesterol levels. Clinical trials have shown that lower LDL levels are associated with a lower risk of cardiovascular disease.

Study-06: Sharanappa Patil, V Ajith Kumar Sandhya Subraman *et al.*, (2018): During this study, 56 patients with chronic renal failure were taken. Dyslipidemia is seen in CRF patients. Although total cholesterol levels in CRF patients were higher than in controls, the difference was not statistically significant. In CRF cases, triglycerides increased statistically significantly. Low-density lipoprotein cholesterol (LDL-C) levels were higher in CRF patients, but the difference was not statistically significant. In contrast, high-density lipoprotein cholesterol (HDL-C) decreased statistically significant when compared to controls. Cardiovascular disease is the leading cause of death in patients with CRF and ESRD. In addition to impairing microcirculation, hypertension may contribute to the development of atherosclerotic coronary artery disease, particularly in the presence of many lipid abnormalities seen in ESRD.

Study-07: D. S. S. K. Raju, D. Lalitha, *et al.*, (2013): The study was conducted on 92 patients with CKD the cases were separated into 2 groups one is a nondialysis group of 50 patients, and another 45 patients in our hemodialysis group in this study was based on elevated blood urea and serum creatinine level and lower eGFR, serum lipid profile oxidative and antioxidative status were studied. In this study hypertriglyceridemia is one of the important abnormalities in CKD patients the serum total cholesterol triglyceride and high-density lipoprotein, and low-density lipoprotein levels are measured. These subjects' high levels of proteinuria were the cause of their hypercholesterolemia. Modified gene expression of HMG-COA reductase, 7 alpha-hydroxylase, and hepatic LDL receptors are involved in the pathway linking hypercholesterolemia to severe proteinuria in CKD. Proteinuria was minor in the current investigation, hence the amount of serum cholesterol did not alter. The concomitant serum lipid changes, such as hypertriglyceridemia, elevated VLDL levels, and decreased HDL levels, in CKD, favor a higher incidence of cardiovascular problems and raise the risk of atherosclerosis. The risk of problems in CKD patients must therefore be reduced by implementing lipid control. These amended measures will significantly enhance the quality of life for CKD patients, especially those receiving hemodialysis.

CONCLUSION

In chronic kidney disease patients, dyslipidemia is a major problem that significantly elevated total cholesterol, triglyceride, low-density lipoprotein, and reduced high-density lipoprotein. Concerning oxidative stress, hypertension, an anti-oxidant condition, was found to be significantly higher in CKD patients when compared to dialysis and non-dialysis patients. In CKD patients on hemodialysis, TG and VLDL levels are higher, while HDL levels are lower. Patients on hemodialysis with CKD are at increased risk of cardiac and cardiovascular events due to increased oxidative stress and compared antioxidants. The factors also contribute to mortality and morbidity in CKD patients, as they promote atherosclerosis and cardiovascular complications. So management of dyslipidemia & end-stage renal disease will improve quality of life.

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Conflict of interest

The authors confirm that this article's content has no conflicts of interest.

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