Original Article

A comparative study of lipid profile between conservatively managed and hemodialysis chronic kidney disease patients

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Abstract

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. The effects of the altered functioning of the renal system are reflected in every organ system of the body. **Aims and Objectives:** To Study of Lipid Profile between Conservatively Managed and Hemodialysis Chronic Kidney Disease Patients. **Methodology:** 100 cases of chronic kidney disease, both males and females, for a period of 1 ½ year admitted in Navodaya Medical College, Hospital and Research Centre, Raichur will be taken for study. Blood: Hb%, TC, DC, ESR., Urine: Albumin, Sugar, Microscopy, Specific Gravity Blood Urea, Serum Creatinine, Fasting & Post prandial blood sugar , Serum electrolytes Lipid profile etc. Investigations carried out. Mean, standard deviation and confidence interval was calculated and the same represented by graphs. Student's t –test (unpaired t-test) was used to calculate the significance between Conservatively Managed and Hemodialysisgroups. **Result:** On comparison of chronic kidney disease patients on hemodialysis and conservative treatment there is significant rise in total cholesterol i.e. 196.92 and 176.68 ($t = 2.105 p<0.021$), triglycerides179.78 and 148.6($t = 2.548; p<0.020$) , LDL 124.23 and 103.82(1.987 ;$p<0.026$) , VLDL 35.31 and 28.62($t = 2.548; p<0.016$) and Lp(a) 48.43 and 33.87($t = 11.983$ $p<0.001$) Respectively , however HDL cholesterol level were found to be significantly lower in hemodialysis patients as compared to patients on conservative treatment i.e. 37.38 and 44.4($t = 2.260; p<0.027$) **Conclusion:** The hemodialysis in our study seems to derange the lipid profile and enhances atherogenesis in patients, as in comparison of chronic kidney disease, patientsof hemodialysis and conservative treatment there was significant rise in total cholesterol, triglycerides, LDL, VLDL and Lp(a) levels, however HDL cholesterol level were found to be significantly lower in hemodialysis patients as compared to patients on conservative treatment.

Key Words: Chronic Kidney Disease, Lipid Profile, Hemodialysis, Serum Creatnine.

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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. The effects of the altered functioning of the renal system are reflected in every organ system of the body. The severity of the consequences of CKD has however undergone profound changes since the advent of dialysis.

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 complications.[1] In recent times dyslipidemia has been identified as a major risk factor for coronary artery disease.[2]

This has renewed interest in the identification and management of abnormalities in the plasma lipids and lipoproteins. An association between lipids and kidney disease was first noted byVirchow[3] who described fatty degeneration of renal epithelium in Bright's disease in 1860.

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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 patients.[4]

In chronic kidney disease the most prevalent lipid abnormalities which have been noted are increased Lp(a), triglycerides and decreased HDL concentration[5,6]. The LDL levels are usually found to be normal or marginally increased. Increased levels of atherogenic lipoproteins, especially LDL and possibly chylomicrons remnants, contribute to the development of atherosclerosis. Increased plasma concentration and reduced diameter favor sub endothelial accumulation of these lipoproteins. Following chemical modifications such as oxidation, the lipoproteins are no longer cleared by normal mechanisms.

They trigger a self-perpetuating inflammatory response during which they are taken up by macrophages to form foam cells a hallmark of the atherosclerotic process. Atherogenic lipoproteins also have an adverse effect on the endothelial function[7]. The arterial narrowing that follows impairs the blood supply to various organs.

METHODOLOGY

100 cases of chronic kidney disease, both males and females, for a period of 1 ½ year admitted in Navodaya Medical College, Hospital and Research Centre, Raichur will be taken for study. For diagnosis of chronic kidney disease, history and physical findings with supportive biochemical and sonological evidence will be taken as criteria. Patients with diabetes mellitus will be excluded from the study.

It is an observational cross sectional study of alterations in lipid profiles in patients with kidney disease of duration more than 6 months. An estimation of total cholesterol, triglycerides, serum HDL cholesterol and VLDL cholesterol will be done by enzymatic method by using an auto analyser, Lp(a) will be done by immunoturbidometry method by using Cobas Integra instrument in Navodaya Central Laboratory. Chronic kidney disease will be diagnosed by clinical examination, biochemical analysis and sonological findings.

Blood: Hb%, TC, DC, ESR.,

Urine: Albumin, Sugar, Microscopy, Specific Gravity Blood Urea, Serum Creatinine, Fasting & Post prandial blood sugar, Serum electrolytes Lipid profile etcinvestigations carried out. Mean, standard deviation and confidence interval was calculated and the same represented by graphs. Student's t test was used to calculate the significance between means for Statistical Analysis.

RESULT

Table 1: Lipid profile in patients with haemodialysis and conservative treatment

Lipid Profile of CKD patients	Hemodialysis	Conservative treatment	p-value (Un-paired t-test)
Total cholesterol	196.92	176.68	t = 2.105;p<0.021
Triglyceride	179.78	148.6	t = 2.548;p<0.020
HDL	37.38	44.4	t = 2.260;p<0.027
LDL	124.23	103.82	t =1.987;p<0.026
VLDL	35.31	28.62	t = 2.548;p<0.016
Lp(a)	48.43	33.87	t=11.983;p<0.001

From above Table 1**,** On comparison of chronic kidney disease patients on hemodialysis and conservative treatment there is significant rise in total cholesterol i.e. 196.92 and 176.68 (t = 2.105p<0.021), triglycerides179.78 and 148.6(t = 2.548;p<0.020) , LDL 124.23 and 103.82(1.987 ;p<0.026) , VLDL 35.31 and 28.62(t = 2.548;p<0.016) and Lp(a) 48.43 and 33.87(t = 11.983 p<0.001) Respectively , however HDL cholesterol level were found to be significantly lower in hemodialysis patients as compared to patients on conservative treatment i.e. 37.38 and 44.4(t = 2.260;p<0.027)

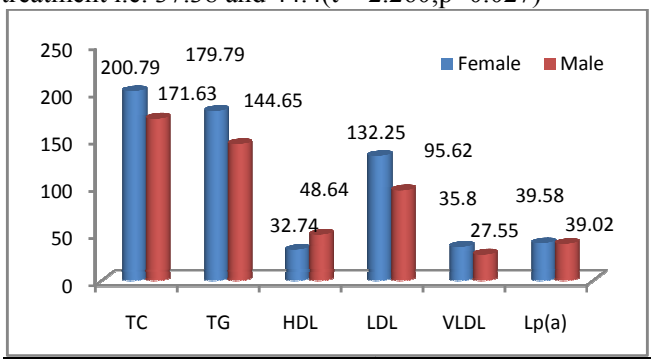

Figure 1: Lipid profile in patients with haemodialysis and conservative treatment

DISCUSSION

This study is a cross sectional descriptive study which included 100 patients of chronic kidney disease who were treated as inpatients or outpatients. The patients included those who were managed with hemodialysis and those on conservative treatment. Progressive renal insufficiency is associated with abnormal lipoprotein transport which may be manifested as hyper lipidemia in a substantial number of patients. Hemodialysis treatment generally seems to worsen the lipid and apo lipoprotein pattern observed in predialytic stage of CKD[8]. M.Senti *et al.*, in their study on patients with CKD on HD had high triglyceride levels.[9] Increased serum triglyceride levels have been well documented in patients on chronic maintenance hemodialysis[10,11]. M.Senti, *et al.*, in their study of CKD patients on HD showed low HDL levels.[9] Morena Marion, *et al.*, in their study on hemodialysis patients states that hemodialysis patients are exposed to several atherogenic factors resulting from qualitative and

functional lipid abnormalities, including triglyceride rich particles, increased susceptibility to LDL oxidation and finally impairment of HDL protective effects.[14]

The results suggest that qualitative abnormalities such as an impairment of HDL associated enzymes are associated with a decrease of HDL levels during hemodialysis. Hence in addition to the known impairment of reverse cholesterol transport, the reduction of HDL protective capacity against oxidative stress could be involved in the development of HD induced atherosclerosis.[14]

J.Pedro - Botet in his study showed increased levels of VLDL fractions in hemodialysis patients. The possible rise of hypertriglyceridemia and changes in VLDL composition as risk factor for coronary heart disease remains a matter of dispute[15]. D.C. Wheeler stated, increased LDL cholesterol and hypercholestremia seen in hemodialysis patients[16]. According to King W. Ma, hypercholesterolemia rarely occurs in uremic and dialyzed patients. Kalra et al reported that Lp(a) levels starts increasing early during the course of CKD and becomes pronounced with increasing severity of dise*a*se.[17]In this study, triglycerides (P=0.020), total cholesterol (P=0.021), HDL (P=0.027), LDL (P=0.026), VLDL (P=0.016) and Lp(a)(p<0.001) were statistically significant (P<0.05) in hemodialysis patients as compared to patients on conservative treatment.

CONCLUSION

On comparison of lipid profile in chronic kidney disease patients on hemodialysis and conservative treatment there is significant rise in total cholesterol, triglycerides, LDL, VLDL and Lp(a) levels, however HDL cholesterol level were found to be significantly lower in hemodialysis patients as compared to patients on conservative treatment.The increase in triglyceride, LDL, VLDL and Lp(a) concentrations are the risk factors for increased cardiovascular abnormalities in CKD patients. Significant reduction in HDL is the important predictive index for the risk of developing coronary artery disease in all groups of patients with CKD.

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