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A comparative study of lipid profile among patients of chronic kidney disease undergoing hemodialysis and peritoneal dialysis at S.M.S. medical college Jaipur

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Abstract
Deterioration of function of kidney resulting in glomerular filtration rate (GFR) <60 ml/min/1.73m2 body surface area for ≥3 months duration irrespective of cause is called chronic kidney disease. Dialysis is the procedure of removing waste products of body metabolism by diffusion process through dialysis machine having dialyser containing semipermeable membrane and removes extra water from extra cellular fluid compartment through ultra-filtration in chronic renal failure patients. This study is aimed to compare the effect of type of dialysis on total lipid profile in chronic kidney disease patients. Study was done in the department of biochemistry in SMS medical college, Jaipur with 60 diagnosed Chronic kidney disease cases (30 patients undergoing hemodialysis & 30 patients undergoing peritoneal dialysis) after all essential clearance was obtained we measured serum level of lipid profile consisting of Total cholesterol(TC), triglycerides(TG), HDL-C,LDL-C,VLDL-C. Observational cross-sectional study was undertaken with statistically unpaired student t test is used where P value < 0.05 assumed significant. In this study it is found that Serum Total Cholesterol, LDL-C, VLDL, TG values were significantly higher and HDL-C is significantly lower in CKD patients undergoing peritoneal dialysis. So, In this Study we can conclude that due to evidence of developing more atherogenic profile in continuous ambulatory peritoneal dialysis patients more chances of cardiovascular complications are there in CAPD therapy compare to haemodialysis therapy in CKD patients.

Keywords: lipid profile, chronic kidney disease, hemodialysis, peritoneal dialysis

Introduction

Deterioration of function of kidney resulting in glomerular filtration rate (GFR) <60 ml/min/1.73m2 body surface area for ≥3 months duration irrespective of cause is called chronic kidney disease. Dialysis is the procedure of removing waste products of body metabolism by diffusion process through dialysis machine having dialyser containing semipermeable membrane and removes extra water from extra cellular fluid compartment through ultra-filtration in chronic renal failure patients [1].

- *Hemodialysis (HD)*: blood comes outside the body and goes through semipermeable membrane of dialyser which filters waste metabolic products and extra fluid.[2]
- *Peritoneal Dialysis (PD): Peritoneal* membrane works as a semipermeable membrane and filters waste metabolic products and extra fluid from the blood into a special dialysis solution called dialysate [3].

There are two types of PD

1. **CAPD:** continuous ambulatory peritoneal dialysis. No any machine is used.
2. **CCPD:** continuous cycling peritoneal dialysis. Machine is used for cycling the blood.

Indian Council of medical research conducted a study and found that there are 7.1% of adults are suffering from diabetes in India. This data increased up to 28% for urban population(age group >40 years) [4, 5] A similar type of study conducted and found that prevalence of hypertension in Indian adult population is 17% in which people from rural area were comprising 14.8% and urban population comprises 21.4% [6] Study conducted among resettlement colony of Delhi by Panesar *et al* found 17.4% adult population of India suffering from hypertension (age group 20-59 years)[7] patients of chronic kidney disease having diabetes or hypertension were found 40-60% of cases[8]. it means if the diabetes and hypertension patients increases in numbers then it will result in more cases of CKD as long-term complications so target population for prevention from CKD should be Diabetic and Hypertensive cases.

Objective of Study

- To assess the Lipid Profile among patients of Chronic Kidney Disease undergoing Hemodialysis & Peritoneal Dialysis.
- To analyse and find relation (if any) of type of dialysis on lipid profile.

Material and Methods

Study was observational Hospital based comparative analysis which was Cross sectional. Study duration was 14 months. Diagnosed cases of chronic renal failure undergoing HD & PD from OPD/IPD S.M.S. Medical College and Hospital, Jaipur were taken as cases. 60 diagnosed Chronic Kidney Disease patients i.e. cases (30 patients undergoing hemodialysis and 30 patients undergoing peritoneal dialysis) with informed consent of observational study of investigations were taken and studied at Department of Biochemistry After approval of ETHICS COMMITTEE SMS MEDICAL COLLEGE AND ATTACHED HOSPITALS,JAIPUR with letter no. 498/MC/EC/2020 dated 4/7/2020.

Inclusion criteria: 1.Chronic renal failure patients on hemodialysis (HD) 2 times weekly 2). CAPD: Adequate continuous ambulatory peritoneal dialysis four or five times

daily.
Maintenance HD/PD duration should be ≥3 months
Exclusion criteria: Cardiac disease patients(recurrent MI, IHD, Angina), nephrotic syndrome, diabetes mellitus, hepatic diseases, Thyroid disorder, familial hypercholesterolemia, patient taking any lipid lowering(statins) drugs, Patients who have not given consent.

Procedural steps
Selection of subject based on inclusion and exclusion criteria went through these steps
Detailed Clinical history, Examination of patients, General physical examination and Investigations table 1 is following:

Table 1: Methods of lipid profile Refrenced from Aashish P. Ajankar *et al* (2010)

No.	Parameter	Method
1	Total	Enzymatic cholesterol oxidase and peroxidase
2	HDL-C	sodium Phosphotungstate-Mgcl2 precipitation
3	Triglycerides	Enzymatic cholesterol oxidase and peroxidase
4	VLDL-C	Indirect method- Friedewald Equation Serum
5	LDL-C	Serum LDL-C =

All above reagents were used of Precision Biomed Company analysed on Beckman Coulter AU-680 analyser
Sample collection and storage – Venous blood sample was taken in the morning from indoor and outdoor chronic kidney disease patients after overnight fasting of at least eight hours and collected in a tube without anticoagulant for the estimation of total lipid profile after half an hour standing of sample for serum separation and then centrifuge it and analysed in Beckman coulters AUC680 analyser machine

Statistical Analysis
Data were entered on MS office excel worksheet in the form of master chart. These data were classified and analysed as per aim and objectives. Qualitative data were presented as percent and proportion. Quantitative data were presented as mean and standard deviation. Appropriate statistical test or unpaired t-test was used. P value < 0.05 was considered as statistically significant.

Results
Most of the persons of cases of chronic kidney disease undergoing dialysis were between 35-65 years in our study Statistically LDL-C and TC, TG, VLDL were significantly higher and HDL-C was significantly lower in cases of peritoneal dialysis group as compared to cases of hemodialysis group. Results are shown in table and graph. Table 2 is following:

Table 2: Serum Lipid Profile in cases of chronic kidney disease undergoing HD and PD

Parameters	Case HD Group 1	Case PD Group 2	P Value
TG(mg/dL)	144±48.95	191.2±68.4	<0.05
TC(mg/dL)	146.5±34.61	181.5±51.99	<0.05
HDL(mg/dL)	49.4±14.47	41.86±8.52	<0.05
LDL(mg/dL)	66.6±31.94	98.73±40.39	<0.05
VLDL(mg/dL)	28.5±10.09	39.36±12.75	<0.001

Discussion
- Dialysate fluid in CAPD process provide glucose to the body which absorbs and make the substrate available for App B containing Lipoprotein synthesis in the liver. It also increases insulin which causes increase in synthesis of triglycerides in liver.This was supported by Kaysen GA (1999), (9)Lacquaniti A *et al* (2010) [10]
- In CAPD patients protein loss occurs at the rate 5-15 g per day into dialysate fluid through peritoneal membrane sieving favouring small molecules of Lipoprotein like HDL more comes out to the dialysate fluid at the rate 34% of it's synthesis rate.This was supported by Kaysen GA (1999), [9] Antonio Lacquaniti *et al* (2010). [10]
- It is reported that in CAPD patients there is a rise in apo C-III compare to HD patients which is a inhibitor of lipoprotein lipase (LPL) which causes breakdown of Triglycerides but due to deficiency of LPL in CAPD patients there is decrease in HDL and rise in TG concentration This was supported by Attman PO *et al* (1999) [11].

Conclusion
In this study we conclude that the patients of chronic kidney disease who are on CAPD therapy regularly for ≥3 Months results in more hyperlipidaemia compare to haemodialysis therapy. This hyperlipidaemia causes atherosclerosis and cardiovascular complications in CAPD patients. By using hypolipidemic drugs and reduction of fatty diet cardiovascular complications in CAPD patients can be prevented which will help in decreasing morbidity and mortality of the patients

Conflict of Interest
NA

Funding Source
NA

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