Variation in Lipid Status In Chronic Kidney Disease Patients On Dialysis
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ABSTRACT
BACKGROUND: Impaired renal function is associated with cardiovascular disease and is a major cause of morbidity and mortality in cardiac patients. Dyslipidemia has been established as a well-known traditional risk factor for cardiovascular disease in the general population and it is well known that patients with chronic kidney disease exhibit significant alterations in lipoprotein metabolism.

OBJECTIVE: To determine variability in lipid parameters in chronic kidney disease patients on dialysis.

MATERIAL & METHOD: A total of 100 subjects (both male and female) were taken for the study. 50 of them were apparently healthy, while the remaining 50 were chronic kidney disease patients on dialysis. The levels of triglyceride, total cholesterol, high density lipoprotein cholesterol, low density lipoprotein cholesterol and very low density lipoprotein cholesterol were estimated using enzymatic methods. Their cardiovascular risk indices (TC/HDL-C and LDL-C/HDL-C) were also determined.

RESULTS: The results indicated that all the parameters were significantly (p<0.05) altered in both sexes when compared with the control group. The cardiovascular risk indices, TC/HDL-C and LDL-C/HDL-C of the chronic kidney disease patients were higher than those of the control group.

CONCLUSION: Chronic kidney disease patients on dialysis are at risk of developing cardiovascular disease.

Key Words: Chronic kidney disease, lipid profile, cardiovascular disease.

INTRODUCTION
Chronic Kidney disease (CKD) is a condition in which there is significant reduction in glomerular filtration rate or chronic irreversible destruction of kidney tissue. Abnormalities in lipid metabolism and dyslipidemia are known to contribute to the glomerulosclerosis and are common in renal disease. It is characterized by various clinical features and biochemical disturbances. The changes includes hematologic abnormalities, cardiovascular problems, gastrointestinal disturbances, neurologic disorder, osteodystrophy, skin disorder and altered sexual function. Hyperlipidemia accelerates renal damage due to progressive glomerulosclerosis and tubulointerstitial disease. The triglyceride rich apoB containing lipoproteins are found to be associated with accelerated deterioration of renal function. Regardless of the etiology of renal disease, patients with chronic kidney disease (CKD) develop profound qualitative and quantitative lipoprotein metabolism abnormalities because of the presence of alterations in apolipoproteins, lipid transfer proteins, lipolytic enzymes, and lipoprotein receptors from the earlier stages of the disease. As renal function deteriorates, triglyceride concentrations increase and high-density lipoprotein cholesterol (HDL) concentrations decline, while levels of low-density lipoprotein (LDL) cholesterol remain in the normal range or become slightly decreased.

Uremic patients have elevated serum levels of triglycerides and lipoprotein and this elevated level of this lipid may contribute to increased cardiovascular risk. In renal failure, these abnormalities of carbohydrate and lipid metabolism presumably contribute to increased risk of atherogenesis, which may be troublesome in patients receiving long-term dialysis. Abnormalities in lipid metabolism and dyslipidemia are known to contribute to the glomerulosclerosis and are common in renal disease.

The aim of the present study was to evaluate the pattern of different lipoprotein changes in CKD patients treated by dialysis and to study the difference of lipid profile between these two groups.

MATERIALS AND METHODS: This is a cross sectional comparative study. The study was conducted at Sheikh Zayed Hospital Lahore from June 2015 to March 2016. A total of 100 adult subjects were taken for this study. Fifty of them (30 males and 20 females) who were apparently healthy were used as control while the remaining 50 (30 males and 20 females) were patients with chronic renal failure on dialysis treatment.
Inclusion Criteria: Uremic patients on dialysis.

Exclusion criteria:
1. Patients with diabetes mellitus;
2. Patients with ischemic heart disease;
3. Patients who have undergone coronary artery bypass graft surgery;
4. Patients on lipid lowering drugs;
5. Patients with history of alcohol consumption and smoking;

5ml of blood sample collected from each subject at fasting state (in the morning) was used to estimate the level of serum total cholesterol, triglyceride, HDL-C, LDL-C, and VLDL-C using enzymatic method with Human Diagnostic test kit. 18. The subjects were divided into four groups, Group 1- healthy males, Group 2- healthy females, Group 3 males with chronic renal failure, Group 4 females with chronic renal failure.

The data collected after biochemical analyses were subjected to statistical calculation using statistical software SPSS 16. The mean, standard deviation/ standard error of mean (s.e), F-distribution test were obtained. Critical value or test of probability less than (P < 0.05) was considered significant.

RESULTS: The results obtained were presented in the tables below.

DISCUSSION

The results show that TC, TG, HDL-C, LDL-C, and VLDL levels of the CRF patients were significantly (p<0.05) altered in both sexes when compared with control groups. The cardiovascular risk indices TC/HDL-C and LDL-C/HDL-C of the chronic renal failure patients were higher than that of control groups. Lipoprotein metabolism is altered in most patients with renal insufficiency. Chan et al 19 and Riepponen et al 4 said that dyslipidaemia develops early in renal failure and it becomes more pronounced as the renal disease progresses because of imbalance between lipoprotein synthesis and degradation. In this study it was observed that all the lipid parameters estimated except HDL-C in chronic renal failure patients.

| Table 1: The means ± s.e TC, TG, HDL-C, LDL-C, and VLDL-C of the male subjects. |
|-----------------|----------------|----------------|----------------|----------------|
| GROUPS          | TC mg/dl       | TG mg/dl       | HDL-C mg/dl    | LDL-C mg/dl    | VLDL-C mg/dl   |
| GROUP 1         | 163.18±23.2    | 102±17.71      | 70.37±11.6     | 75.4±19.33     | 20.1±3.8       |
| GROUP 3         | 230.47±27      | 137.28±8       | 51.81±1.54     | 152±7.34       | 27±7.73        |
| P-Value         | P<0.05         | P<0.05         | P<0.05         | P<0.05         | P<0.05         |

| Table 2: The ratios of TC/HDL-C and LDL-C/HDL-C of the male subjects. |
|-----------------|----------------|----------------|
| GROUPS          | TC/HDL-C       | LDL-C/HDL-C    |
| GROUP 1         | 2.31           | 1.07           |
| GROUP 3         | 4.44           | 2.93           |

| Table 3: The means ± s.e TC, TG, HDL-C, LDL-C, and VLDL-C of the female subjects. |
|-----------------|----------------|----------------|----------------|----------------|
| GROUPS          | TC mg/dl       | TG mg/dl       | HDL-C mg/dl    | LDL-C mg/dl    | VLDL-C mg/dl   |
| GROUP 2         | 155.8±5        | 97.42±26.57    | 65.73±1.5      | 71.53±19.3     | 19.33±0.38     |
| GROUP 4         | 220.41±30.93   | 129.31±35.42   | 54.13±7.7      | 135.34±17.71   | 25.90±17.71    |
| P-Value         | P<0.05         | P<0.05         | P<0.05         | P<0.05         | P<0.05         |

| Table 4: The ratios of TC/HDL-C and LDL-C/HDL-C of the female subject |
|-----------------|----------------|----------------|
| GROUPS          | TC/HDL-C       | LDL-C/HDL-C    |
| GROUP 2         | 2.37           | 1.08           |
| GROUP 4         | 4.07           | 2.50           |
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were significantly (p<0.05) higher than those of normal subjects irrespective of the sex. Cardiovascular risk indices, TC/HDL-C and LDL-C/HDL-C indicated in both sexes that cardiovascular risk is higher in CRF patients. Fuh et al 20 demonstrated that plasma TG, VLDL-C were significantly higher while HDL-C was significantly lower in CRF patients and this associated with decreased synthesis of Apo A1 /ADC.

Ekonoyan 5 said that reduced catabolism of lipoprotein rich in TG is an early fundamental disturbance of lipoprotein metabolism in renal disease but clinical evidence suggested that this is not necessarily linked to increased plasma concentration of TG. In this study it was observed that TG rich lipoprotein (VLDL and LDL-C) and TG itself were significantly higher (p <0.05) in CRF in both males and females. This suggested that renal disease (CRF) affects the metabolism of TG, VLDL-C and LDL-C, and this predisposes the patient to cardiovascular disease. Though Kunle etal 12 and Sharma 13 observed no hyperlipidaemia in patients with CRF, Gupta 21 Das et al 22, Zoccali 23 and Chan et al 19 observed lipid abnormalities.

LIMITATIONS
A more extensive study including large patient population and for longer duration with proper clinical trial is required to achieve a firm conclusion. Study to detect hypertriglyceridemia induced qualitative alteration of HDL and LDL particles will provide additional information on the development of cardiovascular complications in CKD patients. Evaluation of predialysis lipid profile in the same patient and follow up lipid profile estimation after repeated dialysis will provide more reliable information on the effect of lipid profile in CKD patients.

CONCLUSION
The significant higher levels of TG, VLDL-C, LDL-C, and lower HDL-C level among chronic kidney disease patients are associated with increased risk of cardiovascular disease. This risk is also evident in the higher ratio of cardiovascular risk indices, TC/HDL-C and LDL/C/HDL-Cin both sexes.

REFERENCES