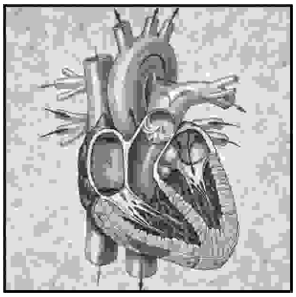
ORIGINAL PROF-977

PATTERN OF DYSLIPIDEMIA IN PATIENTS WITH CRF



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ABSTRACT ... drkamin2002@yahoo.com **Objectives:** (1)To find the pattern of dyslipidemias in patients with CRF. (2.)To compare the results with international studies. **Design:** Prospective observational study. **Setting:** In Medical Unit I, II, III and Nephrology ward of Allied Hospital Faisalabad. **Period:** (06 Months) From: Nov 2004 to April 2005. . Allied Hospital is a teaching hospital attached with Punjab Medical College Faisalabad having 1100 beds. Chronic renal failure, a very common disease, is accompanied by many complications. One of such complications is abnormality of lipids. The lipids are disturbed in a characteristic manner. This disturbed lipid pattern predisposes the patients to atherosclerotic complications and increased mortality due to cardiovascular and cerebrovascular accidents. Present study was conducted to determine the pattern of dyslipidemias in patients of CRF.50 patients diagnosed to have CRF were subjected to fasting lipid profile, irrespective of cause and sex. Maximum patients had elevated triglyceride levels (46%). A considerable percentage (16%) had decreased HDL levels and a small percentage had elevated LDL (4%). Total lipids were found to be elevated in 04 patients (8%). All the patients with elevated total lipid were suffering from diabetes mellitus. Total cholesterol was elevated in 08 patients (16%). This disturbed lipid pattern has role in atherosclerosis. The patients of CRF who are already having disturbed endothelial function are more prone to it.

Key words: Dyslipidemia, End stage renal disease, high density lipoprotein, chronic glomerulonephiritis, Hypertensive Nephrosclerosis, Hypertriglyceridemia, Atherosclerosis.

INTRODUCTION

Chronic renal failure is characterized by an irreversible loss in renal function. Deterioration in renal function takes many years to reach the stage of ESRF. Its course

is accompanied by many complications e.g. anemia, osteodystrophy, electrolyte imbalance, fluid over load hypertension and dyslipidemia[1,2]. These complications occur irrespective of the primary cause of CRF. These results in rapid deterioration in renal function and some like hyperkalemia can cause sudden death due to cardiac arrythmias. Every possible attempt should be made to detect these at early stage and manage them properly. Availability of dialysis facility has prolonged the survival of these patients and more attention is now being paid in this field.

One of such complications is disturbed lipid profile i.e. concentration of various lipids is disturbed with respect to each other, while total lipid remains within normal range. Triglycerides are elevated, HDL decreases, LDL shows lesser rise but the characteristic change which it undergoes is alteration in particle size. This disturbed lipid pattern accelerates the process of atherosclerosis[3].

These patient are more prone to it due to coexisting, hypertension and calciphylaxis. Atherodclerotic process of renal arteries impairs the blood supply, further damaging the kidneys. While this process in heart and brain causes morbidity due to cardiovascular and cerebrovascular accidents.

This study is conducted in Allied Hospital Faisalabad, a hospital recognized for post graduate training with highly equipped laboratory facilities. Diagnosis is established on he basis of history, examination and investigations. Early morning samples were taken after overnight fasting and sent to laboratory.

MATERIAL AND METHODS

Study Population

Patients diagnosed to have chronic renal failure on the basis of history, examination and investigations.

Setting

The study was carried out in patients admitted in Medical Unit I, II, III and Nephrology ward of Allied Hospital Faisalabad. Consecutive 50 patients with CRF irrespective of cause, age and sex were subjected to lipid profile.

Procedure

Diagnosis of CRF was established with the help of history, examination and laboratory investigations, showing blood urea and serum creatinine. Special tests like ultrasonography and renal scan were used to determine the underlying cause it was assured that patient is not receiving any lipid lowering drug and has not undergone hemodialysis or peritoneal dialysis. Patients were properly informed about the study and consent was taken.

Overnight fasting samples were taken and sent to laboratory immediately. Reagents used were those of “Merck Diagnostica Germany”

Total lipids were determined photometrically using N. Zollner and K. Kirsch method with serum undergoing sulphophosphovanillin reaction in which serum is heated with phosphoric acid vanillin reagent.

Triglycerides were measured by ready to use reagent causing enzymatic splitting with lipoproteinlipase and quinoneimine as indicator. Total cholesterol, HDL, LDL were measured by “CHOD PAP METHOD” using ready to use reagents.

Inclusion Criteria

All the patients with CRF irrespective of cause, age, sex.

Exclusion Criteria

i. Patients with CRF who have undergone dialysis once or more.

ii. Patients with CRF receiving any lipid lowering therapy.

Statistical Test Applied

Chi square test was applied; P values and standard deviations were calculated.

RESULTS

This study was carried out on fifty patients of chronic

renal failure. Out of 50 patients, 37 male and 13 female i.e. 74% male, 26% female.

Mean age of whole the population was found to be 55.80±16.31 years. Mean age of male patients was 54.97±17.06 years and of female patients was 58.15±14.02 years.

These patients were arranged in three groups as under.

Group I < 30 yr.
Group II = 30-50 yr.
Group III > 50 yr.

Nine patients fell into group I, one in group II and forty in group III. Majority of patients falling in group III indicate that underlying disease took considerable time to cause CRF. Most of the group I patients were suffering from polycystic kidney disease and chronic glomerulorephirits. The only one patient in group II was hypertensive. This has been represented in Table II.

Different diseases causing CRF in observed population were found to be diabetes mellitus, hypertension, benign prostatic hyperplasia, chronic glomerulonephiritis, polycystic kidney disease and renal parenchymal disease Table I & II.

Estimation of blood urea levels showed that mean level of whole the population was 212.00±57.83 mg/dl. Mean creatinine level of whole population was found to be 9.30±5.48 mg/dl.

Triglycerides were elevated in 23 patients, average level in these patients was found to be 225.87 mg/dl (Table III & IV). These patients were from all the diseases causing CRF in observed population. Although maximum level was found in diabetes mellitus i.e. 238.40±103.17 mg/dl.

HDL was found to be low in eight patients with average level 30.62 mg/dl. Out of eight patients, three were having DM, three were suffering from hypertension and two BPH.

LDL was elevated in two patients; average level was 214.50 mg/dl. P value was found to be 0.0248.

Table-I. Number of males and females with different diseases

Diseases	Male	Female	Total
Polycystic kidney disease	2	2	4
Diabetes mellitus	10	5	15
Hypertension	8	4	12
Renal Parenchymal disease	4	2	6
Benign prostatic hyperplasia	7	-	7
Chronic glomerulonephritis	6	-	6
Total	37	13	50

Table-II. Mean Age of Patients with Different Diseases

Diseases	Mean Age	S.D.
Polycystic kidney disease	48.50	23.68
Diabetes mellitus	61.20	11.31
Hypertension	54.16	17.41
Renal Parenchymal disease	62.00	3.40
Benign prostatic hyperplasia	63.28	5.05
Chronic glomerulonephritis	35.50	21.15
Mean	55.80	14.50

Total Cholesterol was found to be elevated in eight patients, six out of these were suffering diabetes mellitus and two were found to be 264.50 mg/dl. Highest value was found in diabetes patients i.e. 275.70 mg/dl. It is clear that diabetes mellitus is playing major role in elevation of total cholesterol.

Total Lipids were found to be elevated in four patients. Average value was found to be 1058.75 mg/dl.

Chi Square Test application to the two variables i.e. lipids and diseases showed that:-

Triglyceride levels are significantly related to causative disease with a value 0.0001. Cholesterol has also got significant relation with causative disease with a value 0.0099. LDL has got no significant relation with causative disease. HDL has also got no significant relation with causative disease.

Table-III. Cases with Different Lipid Levels in Both Sexes

Lipid	Male			Female		
	Low	Normal	High	Low	Normal	High
Triglycerides	-	24	13	-	3	10
HDL	5	32	-	3	10	-
LDL	-	37	-	-	11	2
Cholesterol	13	21	3	3	5	5
Total Lipid	2	34	1	3	7	3

Table-IV. Total No of Cases with Variation in Lipids

Types of Lipids	Low	Normal	High
Triglycerides	-	27	23
HDL	8	42	-
LDL	-	48	2
Cholesterol	16	26	8
Total Lipid	5	41	4

DISCUSSION

Advances in medical sciences have resulted in prolonged survival of patients suffering from chronic diseases. More and more is being known about pathologies and attempts are being made to slow the progression. Chronic renal failure patients are also having this advantage due to dialysis facilities and attempts are being made to protect them against complications.

Lipid abnormalities are very common complications of CRF. These are characterized by alteration in individual lipid levels while total lipids usually remaining within normal range.

Present study is also concerned with determination of pattern of dyslipidemia in CRF patients who have undergone dialysis. 50 patients were included in the study, out of it 37 were male and 13 female. Mean age of patients was 55.80±14.50 years.

Triglycerides were elevated in 23 patients, 13 were male and 10 female. Out of these 23 patients with elevated triglycerides, 14 were suffering from DM, 02 were having polycystic kidney disease, 04 hypertension and 3 renal parenchymal disease. Although maximum patients were having DM but considerable i.e. 9 patients (40%) were suffering from other diseases. This means that hypertriglyceridemia in these patients is due to CRF. Total number of diabetic patients in study were 15. Out of these 14 were found to have elevated triglycerides. Although DM is itself accompanied by dyslipidemia, but elevation triglycerides in such a high percentage of patients clearly indicates that dyslipidemia of CRF is responsible for it. Furthermore, the diabetics were those who had been receiving treatment for control of their diabetes and control of diabetes would have decreased the severity of dyslipidemia of DM. So, elevated level of triglycerides in diabetic patients can not be solely attributed to DM itself, although maximum level was found in these i.e. 238.40±103.17 mg/dl.

This elevation in triglycerides corresponds to other

studies carried out internationally. In a study carried out by Micheal P.T Gillete and his colleagues in department of Biochemistry UAE University; United Arab Emirates, published in Ann. Saudi Med. 2001, triglycerides were found to be elevated in patients of CRF[4] same was concluded by J. Syrjanen and his colleagues[5].

This elevation in triglycerides level is due to impaired activity LPL in CRF[6]. This results in impaired degradation of VLDL and chylomicron remnants is far greater than VLDL[7].

HDL level was found to be low in 8 patients i.e. 16% of study population. Out of 8 patients, 5 were male and 3 female. 2 patients were having BHP, 3 HTN and 3 DM. It is obvious that patients from different diseases are equally predisposed to have decreased HDL level. Even if we think of DM as dyslipidemic condition, decreased HDL level in HTN and especially in BPH are only explained by dyslipidemia of CRF.

Bhagwat R, Joshi SP[8] and his colleagues carried out similar study at department of pathology, choithram Hospital and Research Centre Indore. This was published in Indian Journal of Clinical Biochemistry, 1997. They studied 114 patients of CRF with different etiologies. They concluded that HDL was significantly low in all the disease groups causing CRF. Although our sample size was smaller than their, but it included all the common diseases causing CRF. The conclusion reached was similar to them i.e. patients from all the etiological groups showed decrease in HDL level.

HDL particles in liver and intestine and carry cholesterol from peripheral tissues to liver and steroid synthesizing tissues like adrenal and ovary. Decreased HDL levels are associated with impaired transport of cholesterol from peripheral body tissues to the area of utilization. So, cholesterol levels are elevated. This is a major risk factor for development of atherosclerosis.

LDL in our study population was found to be elevated in two patients only. These two were suffering from diabetes mellitus. While rest of 48 patients were having normal LDL. This means that LDL levels are not commonly elevated in CRF patients. The characteristic change, which LDL undergoes in CRF, is alteration in particle size. LDL is heterogeneous molecule consisting of proteins, fatty acids, phospholipids and cholesterol. It undergoes oxidative modification in CRF. This results in production of LDL-6 or small dense LDL, a highly atherogenic particle. So basic change regarding LDL is not elevation in its level, but change in particle configuration and size.

Bhagwat R. and his colleagues also reached similar conclusion, that LDL shows statistically insignificant rise in dyslipidemia of CRF[8].

Total cholesterol was found to be elevated in 8 patients. This means that 16% of study population was having elevated cholesterol. Out of 8 patient, 6 were suffering from diabetes mellitus and 2 were having renal parenchymal disease. It is obvious that in this pattern of dyslipidemia, diabetes is plying a significant role.

Total lipids were found to be elevated in 4 patients, all were suffering from DM, 41 patients were found to have total lipids within normal range, 5 patients were found to have level below normal, reason for it could not be found.

It is obvious from this study that CRF patients are complicated by characteristic from of dyslipidemia. Triglycerides are elevated, HDL decreases, LDL rises less significantly and total lipid remains within normal limit.

Resulting dyslipidemia contributes to pathology in two ways

i. By promoting atherosclerosis
ii. By further deteriorating renal function directly

Atherosclerosis process and predisposing lipid abnormalities are over simplification of the processes going on in uremia. In fact, lipid metabolism in CRF is disturbed at various sites including synthesis, transport,

metabolism and receptor level interaction[9]. Coexisting abnormalities like endothelial dysfunction, hypertension and calciphlaxis promote the process of atherosclerosis.

Deterioration in renal function occurs by direct effect of dyslipidemia. Glomerular cells, basement membrane and tubular cells are exposed to lipoproteins. After primary insult, glomerulus gets demaged, allowing influx of macromolecules. Phopholipids from substrate available for inflammatory mediators[10]. Macrophage activation occurs and inflammatory process starts in glomeruli and interstitium. Vasoconstriction and mesangial cell proliferation occurs, resulting in lipoprotein glomerulopathy characterized by intraglomerular lipoprotein thombi and finally glomeruloclerosis[11,12]. Atherosclerosis predispose the CRF patients to cerebrovascular and cardiovascular accidents, greatly increasing the morbidity and mortality. Various drugs atrovastatin[13] are being used to lower the lipid level. Present study will give us insight into the problem regarding pattern of dyslipidemias. This will also help in formulating the type of therapy used so that CRF patients may be managed in better way.

CONCLUSION

Following conclusions were drawn from this study.

- CRF is complicated by characteristic dyslipidemias.
- Triglycerides are elevated.
- HDL decreased.
- LDL rises with lesser percentage as compared to triglycerides.
- Total lipids remain almost within normal range so it is basically disturbed pattern of lipids rather than elevation.
- Males and females both are affected without any discrimination of sex.

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