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A Clinical Study of Nephrotic Syndrome with Special Reference to Serum Lipid Profile

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Abstract
Aims and Objectives: *To study the levels of serum cholesterol, serum triglycerides, HDL, LDL and VLDL during the onset and remission of nephrotic syndrome.*
Methods and materials: *A prospective observational study included 50 children with nephrotic syndrome, aged between of 2-12 years with 30 age and sex matched controls were studied at SVS Medical College and Hospital, Mahabubnagar during period of July 2015 to November 2017.*
Results and discussion: *Serum cholesterol, triglycerides, LDL, VLDL was elevated in all patients (100%) which is statistically significant with p-value 0.000. However, there was no significant (p = 0.234) change in HDL cholesterol when compared to controls. lipid levels (serum cholesterol, triglycerides, LDL, VLDL) In first episode of nephrotic syndrome cases were decreased significantly during remission, whereas in relapse cases lipid levels were significantly higher even during remission.*
Conclusion: *The present study shows that in nephrotic syndrome, there is elevated levels of lipids even during remission. There was significantly higher hyperlipidemia in relapse cases compared to first episode of nephrotic syndrome.*
Keywords: *Nephrotic Syndrome, Cholesterol, LDL, VLDL, HDL*

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I. Introduction

Nephrotic syndrome is a kidney disease characterized by heavy proteinuria, hypoalbuminemia, hyperlipidemia and oedema. The cumulative prevalence rate is approximately 15.5 cases per 100,000[1]. The pathogenesis of nephrotic syndrome is still not clear.Increased synthesis as well as decrease in clearance of lipoprotein may contribute to the hyperlipoproteinemia[2].Lipoproteins play an important role in the transport of plasma lipids; their increase or alteration in various fractions may be responsible for hypercholesterolemia, in nephrotic syndrome[3].There is increased total cholesterol, LDL cholesterol, VLDL cholesterol and triglycerides and normal or low HDL cholesterol[4].Nephrotics are at an increased risk for Cardiovascular disease and renal injuries due to the hyperlipidaemic state[5].

II. Aims

To study the levels of serum cholesterol, serum triglycerides, HDL, LDL and VLDL during the onset and remission of nephrotic syndrome.

III. Patients And Methods

Patients in the age group of 2-12 years with typical clinical features of nephrotic syndrome that are admitted to SVS Medical College and Hospital, Mahabubnagar, between July 2015 to November 2017 are included in the study. The children less than 2 years and greater than 12 years and children with liver disease, kidney diseases other than nephrotic syndrome, protein energy malnutrition, congestive heart failure,diabetes mellitus, hypothyroidism and family history of hypercholesterolemia were excluded. Written consent was obtained from parent prior to enrolment and the study was approved by institutional ethical committee.

IV. Data Collection

Data was collected by using pre-tested proforma meeting the objectives of the study. Nephrotic syndrome was diagnosed based on presence of peri-orbital puffiness, spot urinary protein creatinine ratio of >2.0, hypoalbuminemia (<2.5 mg/dL), and hypercholesterolemia (>200mg/dL). Method used for estimation of lipid profile is CHOD POD method. Fifty patients were taken into study who were clinically diagnosed as nephrotic syndrome. Thirty cases who were age-matched and without liver and kidney disorders were taken as control group. Detailed history was taken. Thorough clinical examination was done.

4.1 Data Analysis And Interpretation

4.2 Statistical Analysis:

Data was analyzed by Graph Pad Prism software (version 6.0). Data was described by Mean ± SD for continuous normal data and data was described by percentages for categorical data. The comparison between two groups for continuous normal data was done by unpaired t-test/ for continuous non-normal data was done by Mann Whitney test or Wilcoxon Rank Sum test. The relation between two variables for continuous normal data was done by Karl Pearson's correlation coefficient test/ for continuous non-normal data was done by Spearman's rank correlation coefficient test. The comparison between three groups for continuous normal data was done by "One-way analysis of variance test" and followed by Bonferroni's Multiple Comparison test. All p-values less than 0.05 were considered as statistically significant.

V. Results

Fifty children in the age group of 2-12 years with nephrotic syndrome were included in the study. They were studied during the onset and remission. Patients were considered in remission when urine albumin nil or trace or proteinuria < 4 mg/m^2/hr for three consecutive days.

Thirty controls were taken.

Table 1: Age-wise distribution of study and control groups**.**

Age (in years)	Study group		Control group		Total	
	No.	%	No.	%	No.	%
2 – 6	30	60	18	60	48	60
7 – 12	20	40	12	40	32	40
Total	50	100	30	100	80	100

A non-significant association was observed between age groups in study and control groups. Maximum number of cases 60% was found in age group of 2-6 years,which is concordance with study conducted by Dr. SabyasachiSom et al[7].

Figure 1: Agewise distribution of study and control groups

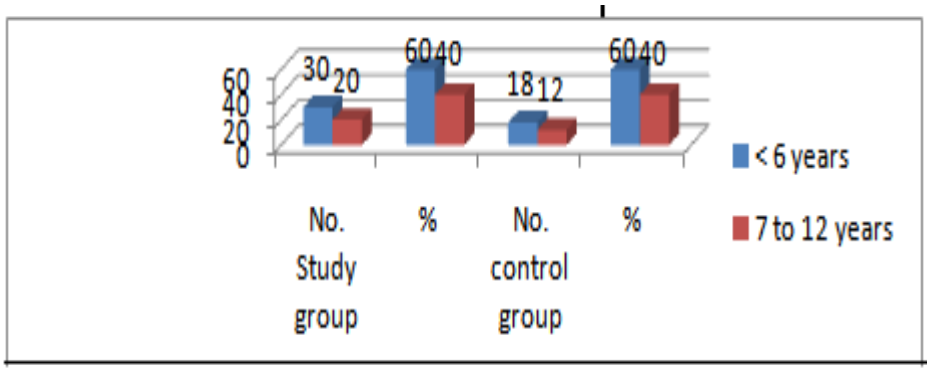


Table 2: Distribution of sex in study and control groups

Sex	Study group		Control group		Total	
	No.	%	No.	%	No.	%
Male	33	66	19	63.3	52	65
Female	17	34	11	36.7	28	35
Total	50	100	30	100	80	100

Among the 50 children studied, 33 were males (66%) and 17 were females (34%). Male preponderance was seen in our study (n=50, 66% male), which is similar when compared to study done by Dr. Jangamgudem Sudha Rani et al (n=50, 66% male)[8].

Figure 2: Distribution of sex in study and control groups

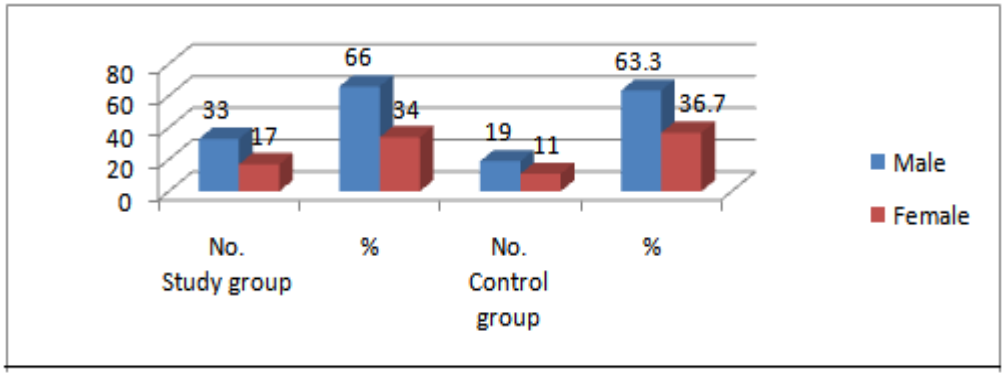


Table 3: Serum lipids in Nephrotic Syndrome

Lipids	Cases (N=50) Mean ± SD	Control (N=30) Mean ± SD	P value	t value
Cholesterol	**420.32±122.69**	**175.37±18.32**	**.000**	**10.84**
Triglycerides	**297.90±93.09**	**94.10±19.39**	**.000**	**11.81**
LDL	**323.75±100.98**	**107.33±16.10**	**.000**	**11.62**
VLDL	**61.79±19.78**	**24.00±9.52**	**.000**	**9.79**
HDL	**49.48±20.00**	**54.16±9.61**	**.234**	**-5.23**

Table 3 shows that the p-value was statistically significant among study group in serum cholesterol, serum triglycerides, LDL and VLDL levels when compared with control. p-value was 0.000 but HDL value was not significant (p = 0.234). Similar findings were found in studies conducted by Dr. Nassem Ahmad et al[9] and Dr. Dnyanesh DK[3].

Figure 3: Serum lipids in Nephrotic Syndrome

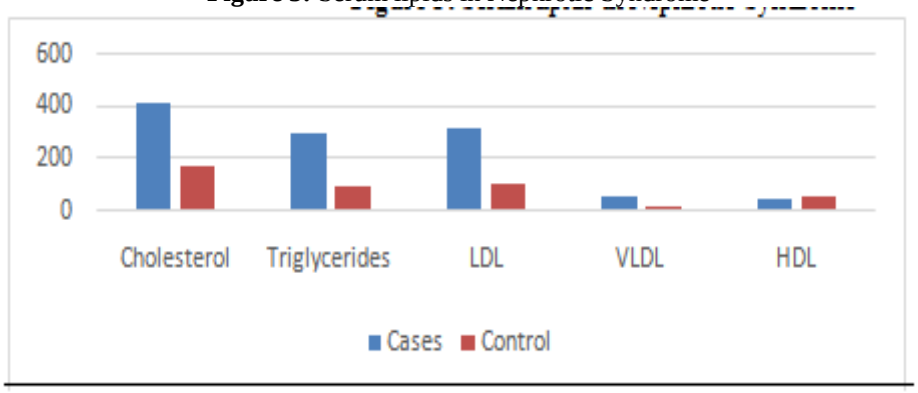


Table 4: Comparison of lipid profile at the onset and during remission in first episode nephrotic syndrome (n=35)

		Mean(mg/dL)		Standard deviation		p-value
		At onset	Remission	At onset	Remission	
Cholesterol	35	372.82	282.74	106.20	47.50	.000
Triglycerides	35	273.37	178.15	84.2	49.43	.000
LDL	35	289.72	191.46	90.18	52.96	.000
VLDL	35	57.24	47.19	18.86	17.24	.002
HDL	35	49.33	54.75	20.20	17.17	.426

Table 4 shows that in first episode of nephrotic syndrome cases lipid levels (serum cholesterol, triglycerides, LDL, VLDL) were decreased significantly during remission and were statistically significant.Mean value of HDL at the onset in first episode was 57.24 mg/dL,while in remission was 54.75 mg/dL. The p-value was not significant (.426).Similar findings were found in studies conducted by Sreenivasa.B et al in the year 2016 [10].

Figure 4: Comparison of lipid profile at the onset and during remission in first episode nephrotic syndrome

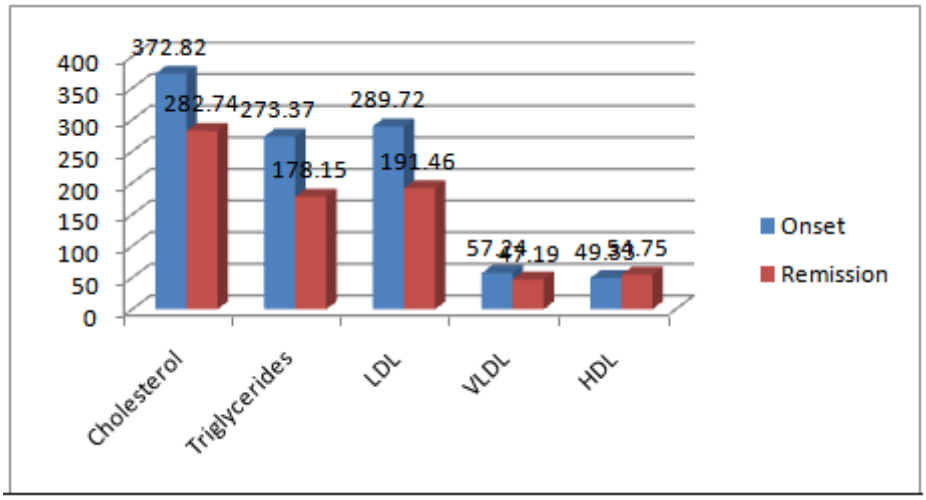
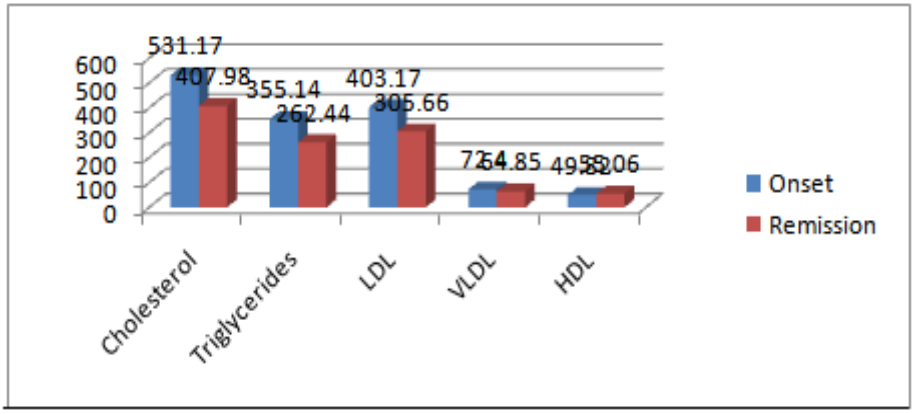


Table 5: Comparison of lipid profile at the onset and during remission in relapse (n=15)

	Number	Mean(mg/dL)		Standard deviation		p-value
		At onset	Remission	At onset	Remission	
Cholesterol	**15**	**531.17**	**407.98**	**80.58**	**96.25**	**.000**
Triglycerides	**15**	**355.14**	**262.44**	**89.97**	**74.09**	**.000**
LDL	**15**	**403.17**	**305.66**	**79.29**	**79.89**	**.000**
VLDL	**15**	**72.40**	**64.85**	**18.26**	**17.24**	**.003**
HDL	**15**	**49.82**	**55.06**	**20.23**	**15.15**	**.566**

Table 5 shows that in relapse cases lipid levels (serum cholesterol, triglycerides, LDL, VLDL) were significantly higher even during remission and were statistically significant. Mean value of HDL at the onset inrelapse cases was 49.82 mg/dL, while in remission was 55.06 mg/dL. The p-value was not significant (.566).Arije A et al also observed persistent rise in serum lipids in frequent relapse cases[11].

Figure 5: Comparison of lipid profile at the onset and during remission in relapse



VI. Discussion

Nephrotic syndrome is a common renal disease among children. The common age group is 2-6 years and boys are affected more than girls. Onset is insidious**.** Hyperlipidemia is thought to be the result of increased synthesis as well as decreased catabolism oflipids. Increased hepatic production of lipoproteins is associated with elevated hepatic synthesis of albumin and secondarily of lipoproteins, through a common or closely related pathway. However, elevated lipid levels may occur even with a normal rate of albumin synthesis. Decreased degradation by a decrease in lipoprotein lipase activity. This may be secondary to the urinary loss of a lipase stimulatory α acid glycoprotein. In the present studySerum cholesterol, triglycerides, LDL, VLDL was elevated in all patients (100%) which is statistically significant with p-value 0.000. Serum HDL was normal in 52% of

cases, decreased in 22% of cases and increased in 26% of cases with p-value (0.234) did not correlate statistically. This is in accordance with study done by by Sreenivasa.B et al, Dr. Nassem Ahmad et al[9] and Dr. Dnyanesh DK[3].In the study Comparison of lipid profile at the onset and during remission in first episode nephrotic syndrome (n=35) has been done and results shows lipid levels (serum cholesterol, triglycerides,LDL,VLDL) were decreased significantly during remission and were statistically significant (p-value 0.000).Mean value of HDL at the onset in first episode was 57.24 mg/dL,while in remission was 54.75 mg/dL. The p-value was not significant (.426). Similar findings were found in studies conducted by Sreenivasa.B et al in the year 2016 [10]. In the present study Comparison of lipid profile at the onset and during remission in relapse (n=15) has been done and result shows that in relapse cases lipid levels (serum cholesterol, triglycerides, LDL, VLDL) were significantly higher even during remission and were statistically significant. Mean value of HDL at the onset in relapse cases was 49.82 mg/dL, while in remission was 55.06 mg/dL. The p-value was not significant (.566).Arije A et al also observed persistent rise in serum lipids in frequent relapse cases[11].

VII. Conclusion

The present study shows that in nephrotic syndrome, there is elevated levels of lipids even during remission. There was significantly higher hyperlipidemia in relapse cases compared to first episode of nephrotic syndrome. In the present study, there is generalised hyperlipidemia which may lead to the risk of atherosclerosis and the progression for chronic renal failure, which calls for modalities to reduce the lipoprotein levels in the management of nephrotic syndrome.

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