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To study lipid profile and its correlation with serum albumin level in Nephrotic syndrome in children

KEYWORDS: Nephrotic Syndrome, Hyperlipidemia ,HDL, LDL, VLDL

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ABSTRACT

Introduction - *Hyperlipidemia is familiar feature of Nephrotic syndrome and usually observed during the active phase of the disease and disappears with resolution of proteinuria. Persistence and severity of lipid changes in serum correlates well with the duration and frequency of the relapses, hence close monitoring of lipid levels is necessary to anticipate complication.*

Material and methods - *Prospective observational cohort study, all children in the age group of 0-12 years with nephrotic syndrome at onset and remission /relapse were included in study and were undergone for serum lipid and albumin estimation. Obtained data were analyzed statistically.*

Result - *The total cholesterol, LDL,TG levels were significantly high as compared to control. There was significant correlation present between albumin and HDL. Serum cholesterol level in relapse case was significantly higher than mean cholesterol in first episode nephrotic syndrome.*

Conclusion - *Monitoring of lipid levels during the remission of the nephritic syndrome especially in those with relapses, is necessary to anticipate complication. No definite correlation can be established between the degree of hypoalbuminemia and rise of lipids.*

Introduction

Nephrotic syndrome (NS) is a chronic glomerular disease, characterized by minimal change Disease in the majority of cases. Hyperlipidemia is familiar feature of Nephrotic syndrome. Although distribution of cholesterol among the plasma lipoproteins and the mechanism of the enhanced hepatic synthesis of lipoprotein lipids are not well understood. Increased synthesis and decreased clearance of lipoproteins may contribute to the hyperlipoproteinemia with increased levels of total and low-density lipoprotein (LDL) cholesterol as the most characteristic abnormality. Impaired clearance of cholesterol and triglyceride rich lipoproteins of lower densities and altered composition of HDL(high density lipoprotein) also seen [1,2,3,4].

Some degree of correlation between lipids and serum albumin as suggested by *Thomas et al* and between lipidemia and edema by *peters et al* generally, when edema regress. Lipid level fall but in some cases, it may continue to persist even after the edema has disappeared. Hyperlipidemia usually observed during the active phase of the disease and disappears with resolution of proteinuria. Hyperlipidemia may contribute to renal injury and Experimental studies demonstrated that reduction of plasma lipids level slow progression of Glomerular and Tubulointerstitial disease[5,6].

The persistence and severity of lipid changes in serum correlates well with the duration and frequency of the relapses, even during the remission hence close monitoring of lipid levels is necessary to anticipate complication. Indian patient has a different dietary, constitutional and genetic composition[7,8,9]. Therefore, this study conducted to determine the spectrum of lipid abnormalities and to know whether any correlation exist between serum lipids level and albumin in Nephrotic syndrome at the onset and during remission.

Material and methods

This institutional based prospective observational cohort study conducted in the Department of Pediatrics, Dr. B.R. Ambedkar Memorial Hospital, and Raipur Chhattisgarh from September 2013 to September 2014 in Children between 0 to 12 years. Age and sex matched normal children attending Paediatric OPD for minor illnesses were used as controls. Informed consent was obtained from all the caregivers who mainly included parents and in a few cases close family relatives who brought the children to the clinic. The study was initiated with approval of institutional ethical committee and written informed consent of parent was obtained prior to enrolment and to conduct various invasive procedure and investigation.

Sample size: - Number of cases-30, Number of controls-10. Study design- Institutions based prospective observational cohort study. Place of study- Department of Pediatrics, Dr. B.R. Ambedkar Memorial Hospital, Raipur (C.G.) Duration of study- September 2013- September 2014 Selection of cases- children between 1-12 years with nephrotic syndrome Selection of controls- Age and Sex matched normal subjects.

All children in the age group of 0-12 years with nephrotic syndrome at onset and remission /relapse were included in study. Those Children were excluded from study those who were unlikely minimal change disease and Patients with prior history of diabetes mellitus, hypothyroidism and familial hypercholesterolemia.

Methods of Collection of Data

Data was collected by using pre-tested proforma meeting the objectives of the study, thirty patients were taken into study who were clinically diagnosed as nephrotic syndrome. Ten cases who were age matched and without liver and kidney, disorders were taken as control group. All study children were undergone for estimation of Se-

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rum total cholesterol (was measured by Enzymatic method) , Serum HDL cholesterol measured by Phosphotungstate method, Serum LDL cholesterol, Serum Triglycerides measured by enzymatic colorimetric method, Serum VLDL measured by Enzymatic method, Serum Albumin measured by Photometric method .

The observations were depicted in tabulated form and correlation of serum lipid level with serum albumin level was studied. Obtained data were statistically analyzed by using appropriate statistical method (chi-square test and probability value, Pearson correlation coefficient (r)

Result and Discussion

In present study maximum number of cases belong to 0-6 year age group with male predominance, male: female ratio was 1.5, 56.67% of cases had severe proteinuria, Serum albumin in nephrotic syndrome is significantly lower than in control t value 19.49 and p value <0.05.

Table 1 showed in our study the total cholesterol, LDL, TG levels were significantly high as compared to control with significant p value < 0.05.

1 Table Lipid profile in cases and controls				
	Cases	Control	t Value	p value
Total cholesterol	403.9	190.1	4.94	<0.05
HDL	46.93	48.3	-0.2029	0.8403
LDL	305.17	119.5	4.9289	<0.05
VLDL	56.267	43.3	1.902	0.0648
TG	282.53	92.7	5.5119	<0.05

Table 2 showing there was significant correlation present between albumin and HDL with r = -0.379, and p value (<0.05). Others are not significant.

Table 2 Correlation between serum albumin and Total Cholesterol, HDL, LDL,VLDL,TG.			
	Mean	Pearson correlation coefficient (r)	P value
Total Cholesterol	403.9	0.041	0.8
HDL	49.93	0.379	0.03
LDL	305.16	-0.051	0.78
VLDL	56.26	0.02	0.91
TG	282.53	-0.174	0.357

An inverse relation between serum albumin and total cholesterol, VLDL were found although correlation was not statistically significant. A direct relation between serum albumin and HDL cholesterol were found but not statistically significant. The mean serum cholesterol level in relapse case was significantly higher than mean cholesterol in first episode nephrotic syndrome.

In present study, the mean total cholesterol was 403.9 mg % which was not that high as reported by Western workers. Milne at el, Bannerjee et al[10,11] reported that the total cholesterol in Nephrotic syndrome may be higher than 1000 mg%, 341 mg% respectively. Thus, we observed that our population show low serum lipid. When we observed correlation between total serum cholesterol and LDL cholesterol we found positive correlation and statistically significant (P=001). David et al, Benakappa et al[12,13] also had similar observations.

When we compare other study regarding Relation between Albumin and Serum Lipids in Nephrotic Syndrome we found that in present study, there is inverse correlation between albumin and cholesterol though the correlation is not statistically significant. Dissimilar results were obtained by *Heymann et al*[14], *Thomas et al* where they found no correlation between development of hyperlipidemia and hypoalbuminemia. Result obtained by *Friedman and byers at el* signify that hypoalbuminemia causes hyperlipidemia. *Bannerjee at el* could not demonstrate any correlation between the severity of hypoalbuminemia and hyperlipidemia, an observation also noticed by us in the present study. We observed a direct relation between serum albumin and HDL cholesterol. When serum albumin was too low, the HDL cholesterol was also low but the correlation was not statistically significant. We also observed an inverse relation between serum albumin and VLDL cholesterol but it was not statistically significant. *Mallik et al*[15] also had similar observations.

On the other hand when we compare other study regarding Response of serum lipids to steroid therapy. We found In initial episodes, serum cholesterol was high before treatment and reduced to normal at the end of treatment, whereas in case of relapses serum cholesterol reduced marginally but it was persistently high. At the end of steroid therapy, in *1st episode Nephrotic syndrome,* there was statistically highly significant reduction in mean levels of pre treatment total cholesterol and LDL and there was also significant reduction the level of pre treatment mean TG. No significant change was observed in mean VLDL. However, there was some increase in mean HDL but was not statistically significant. *Arije et al*[16] observed a significant fall from the high mean pre treatment level of total cholesterol and LDL cholesterol at 4,8,12 weeks of treatment while the fall in mean TG level only became significant at 8 weeks. The mean HDL cholesterol did not change significantly throughout the treatment. Whereas *in cases of relapses*, even at the end of steroid therapy there was no significant reduction in serum lipids and found to be persistently high. *Merouani et al*[17] observed hyperlipidemia during the active phase of the disease and disappeared with resolution of proteinuria and was persistently abnormal in frequency. *Tsukahara et al*[18] observed that children with frequently relapsing nephrotic syndrome have prolonged periods of hypercholestrelemia, even during clinical remission. *Buyokcelik et al*[19] observed significant reduction in total cholesterol.

Conclusion

Monitoring of lipid levels during the remission of the nephritic syndrome especially in those with relapses, is necessary to anticipate complication. No definite correlation can be established between the degree of hypoalbuminemia and rise of lipids. However, it is absolutely observed that serum cholesterol level in relapse case was significantly higher than mean cholesterol in first episode nephrotic syndrome.

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