Original Research Article

A study of Serum lipids among children suffering from nephrotic syndrome

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Abstract

Background: Hyperlipidemia is a common findings in nephrotic syndrome. There is increased total Cholesterol, LDL Cholesterol, VLDL cholesterol and lower normal HDL Cholesterol. There is paucity of studies on derangement of serum lipids with nephrotic syndrome in Indian children. Hyperlipidemia is usually observed during the active phase of disease and disappears with resolution of proteinuria. **Objective:** A study of Serum lipids among children suffering from nephrotic syndrome. **Materials and Methods:** A Prospective study was conducted at Basaveshwara Medical College, Chithradurga from January 2018 to June 2018. A total of 60 cases of children with nephrotic syndrome who were admitted for the first time in the pediatric ward our hospital was included in the study. Their clinical status was confirmed by clinical examination and laboratory tests including urine examination for protein, blood urea, serum cholesterol and serum proteins study included. **Results:** In our study nearly 76.7% of the study subjects were less than 6 years and 23.3% of them were between the 7 to 12 years. In our study the overall total Cholesterol level, LDL Cholesterol, VLDL Cholesterol, and Triglyceride were found to be much higher than the controls and the association was found to be statistically very significant. Among the cases with steroid sensitive Nephrotic Syndrome the mean cholesterol level was found to be 429.6 mg/dl and 685.9 mg/dl in Steroid Resistant Nephrotic syndrome. **Conclusion:** Our study concludes that, in nephrotic syndrome, there is generalized hyperlipidemia (except HDL).persistent elevation in the cholesterol levels, which may predispose to development of atherosclerosis and progression to chronic renal failure.
Key Word: Hyperlipidemia, Nephrotic Syndrome In Children, Lipoproteins, Iskdc Treatment, Statins.

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INTRODUCTION

'Hippocrates' first observed that, "when bubbles settle on the surface of urine they indicate disease of the kidney". The nephrotic syndrome is not a single disease. It is a clinical state characterized by "Heavy proteinuria and hypoalbuminemia, often associated with edema, hyper cholosterolemia, and generalized hyper lipidemia".[1] Since 1917, Hyperlipidemia has been considered to be a one of the common feature of Nephrotic Syndrome.[1] Although pathophysiological aspects of hyperlipidemia have not been completely identified, hypoalbuminemia, increased lipoprotein synthesis and decreased lipoprotein lipase activity are described by various workers.[2] Thomas *et al* in his study had suggested that there is some degree of correlation between lipids and serum albumin and even peters *et al* had opined that there is association between lipidemia and edema. Generally, when the edema decreases, the lipid levels fall and in some cases it even continues to persists even after the disappearance of edema.[3] Hyperlipidemia is usually observed during the active phase of the disease and disappears with resolution of proteinuria. However, it may persist in some cases, leading to increased risk of atherosclerosis in later life. Hence, close monitoring of lipid levels during remission of nephritic syndrome is necessary to select high-risk patients. Lipoprotein plays an important role in the transport of plasma lipids. They are Chylomicrons, VLDL, LDL, and HDL. Recent advances in lipoprotein research further helped to analyses the hyperlipidemia of

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nephrotic syndrome in terms of abnormalities of lipoprotein metabolism. Hypercholesterolemia is usually present, but the incidence of hypertriglyceridemia is more variable. LDL level are usually elevated and if triglyceridemia is present increased VLDL is also observed. On other hand, increase in chylomicrons is less usual but not uncommon. Levels of intermediate density lipoprotein (IDL) cholesterol are variable.[4,5]

MATERIALS AND METHODS

A Prospective study was conducted at Basaveshwara Medical College, Chithradurga from January 2018 to June 2018. A total of 60 cases of children with nephrotic syndrome who were admitted for the first time in the pediatric ward our hospital was included in the study. Their clinical status was confirmed by clinical examination and laboratory tests including urine examination for protein, blood urea, serum cholesterol and serum proteins study included All the cases of Nephrotic Syndrome were clinically examined and lipid profile was estimated in each cases before starting the Steroid therapy. An equal number of controls (60) who were visiting the immunization clinic of the hospital were selected for the study.

Inclusion Criteria: All infant s and children between 0-12 years of age suffering from nephrotic syndrome.

Exclusion Criteria:

- Children with liver disorders.
- Children with edema due to Kwashiorkor
- Children with edema due to CCF
- Children suffering from kidney diseases other than nephrotic. syndrome.

Treatment Protocol: International study group on kidney diseases in children(ISKDC) regimen.[6] Prednisolone 60mg/m2 /day in 3 divided doses for 4 weeks followedby prednisolone 40mg/m2 on alternate days for the next 4 weeks.

RESULTS

A total of 60 cases were included in the study and analyzed.

Table 1: Social profile of study subjects

Social profile		Number of cases	Percentages
Age	0-6 Years	46	76.7
	7-12 Years	14	23.3
Gender	Male	29	48.3
	Female	31	51.7
Place	Urban	35	58.3
	Rural	25	41.7

In our study nearly 76.7% of the study subjects were less than 6 years and 23.3% of them were between the 7 to 12 years. The Male were 48.3% of the study subjects and nearly 58.3% were from Urban area.

Table 2: Serum Lipids levels among Cases

Mean Serum Lipid Profile	Cases		Controls		P value
	Mean	SD	Mean	SD	
Total Cholesterol	429.8	185.5	191.2	48.6	<0.001
LDL Cholesterol	320.2	152.8	120.1	53.2	<0.001
VLDL Cholesterol	55.6	23.4	43.2	5.2	<0.001
HDL Cholesterol	48.9	18.5	49.3	4.8	0.083
Triglycerides	286.3	109.2	93.5	18.9	<0.001

In our study the overall total Cholesterol level, LDL Cholesterol, VLDL Cholesterol, and Triglyceride were found to be much higher than the controls and the association was found to be statistically very significant for all the lipid parameters except for HDL Cholesterol levels.

Table 3: Steroid Sensitive /Resistant Nephrotic Syndrome

Group	N	%
Steroid Sensitive	55	91.7
Steroid Resistant	5	8.3

The Nephrotic Syndrome was found to be steroid sensitive among 91.7% of the subjects and 8.3% of them had steroid resistant Nephrotic Syndrome.

Table 4: serum cholesterol in steroid sensitive and Resistant nephrotic syndrome

Group	N	Mean Serum Cholesterol (mg/dl)	P value
Steroid Sensitive	55	429.6	<0.002
Steroid Resistant	5	685.9	

Among the cases with steroid sensitive Nephrotic Syndrome the mean cholesterol level was found to be 429.6 mg/dl and 685.9 mg/dl in Steroid Resistant Nephrotic syndrome. The association was found to be statistically significant.

Table 5: Serum cholesterol levels after 4 Weeks of the treatment

Mean Serum Lipid Profile	Cases	
	Mean	SD
Total Cholesterol	386.6	102.3
LDL Cholesterol	286.6	85.3
VLDL Cholesterol	48.4	12.3
HDL Cholesterol	47.6	2.3
Triglycerides	229.8	67.2

After the steroid therapy for four weeks there no significant changes in the serum Lipid Profile when compared to pre-treatment levels of Nephrotic syndrome.

DISCUSSION

In the present study of 60 cases with nephrotic syndrome nearly 76.7% of the children were less than 6 years of age and it was more among female subjects than male subjects. in the study done by Tsukahara H *et al*[7] also reported the higher incidence of nephrotic syndrome among children aged less than 6 years which is similar to our study findings. In our study there was significant rise in the levels of total cholesterol, LDL Cholesterol, VLDL

Cholesterol, Triglyceride levels, whereas HDL Cholesterol level was within the normal limits among the cases. In the other studies done by Airje *et al*[8] also observed persistent rise in the serum lipids in the nephrotic syndrome cases. In another study done by Milne *et al*[9]reported that the total cholesterol levels in the nephrotic syndrome may be as high as 1000mg/dl. In another study done by Banerjee *et al*[10] the findings of total serum cholesterol levels were almost similar to the findings of our study. David *et al*[4] and Benakappa *et al*[5] found positive correlation between serum total cholesterol and LDL Cholesterol. In our study nearly 91% of them were found to steroid sensitive Nephrotic Syndrome. All cases were treated with short term high dose prednisolone (ISKDC) regimen. Even after the starting the steroid therapy the levels of lipid profile did not show significant reduction in the values at the end of 4 weeks of the treatment. Arjie *et al*[8] did a study on short term treatment with prednisolone among the children with nephrotic syndrome found significant fall in the mean levels of total cholesterol and LDL Cholesterol at the end of 4 weeks of the therapy.

CONCLUSION

In nephrotic Syndrome there is generalized Hyperlidemia and hypoalbuminemia. The serum cholesterol level and other parameters values of serum lipid profile were on the higher side and reduced gradually after the initiation of steroid therapy. But still at the end of 4 weeks of steroid therapy the lipid profile did not reach the normal limits and needs further prolonged treatment with steroids. Among the Steroid resistant cases the reduction of cholesterol levels will be low even on steroid therapy and prolonged rise in cholesterol level might predispose to the development of atherosclerosis and can further progress to chronic renal failure.

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