Section: Pediatrics

Original Research Article

DYSLIPIDEMIA IN CHILDHOOD NEPHROTIC SYNDROME-A FOLLOW-UP STUDY

Jose O Ouseph[1], Jijesh. Alarambil[2]

[1]*Associate Professor, Department of Paediatrics, Government TD Medical College, Alappuzha, India.*
[2]*Assistant Professor, Department of Paediatrics, Government Medical College, Kannur, India.*

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Corresponding Author:
Dr. Jijesh. A,
Assistant Professor, Department of Pediatrics, Government Medical College, Kannur, India.
Email: jijeshalarambil@gmail.com

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ABSTRACT

Background: Nephrotic syndrome is a commonest glomerular disorders in children. Hyperlipidemia is observed during the active phase of the illness and can contribute to atherosclerosis and renal damage. **Objectives:** To assess the severity and duration of serum lipids abnormalities and their potential as predictor of relapse in childhood nephrotic syndrome.
Materials and Methods: Prospective study, conducted in Pediatric Department, Govt. TD Medical college, Alappuzha, included 30 children, aged between 1-12 years.
Results: In our study the mean cholesterol and Triglyceride level at admission was high but by the end of 24 weeks Cholesterol and Triglyceride levels were found to be normal. Elevated cholesterol was notably persistent in relapsers.
Conclusion: There is no persistent hyperlipidemia in NS at 24 weeks in both first episode and relapse. Elevated cholesterol levels at 6 and 12 weeks were significantly associated with relapse risk. Routine hyperlipidemia treatment is not warranted, but close monitoring and possible extended steroid therapy for high-risk children are recommended.
Keywords: Hypercholesterolemia; Dyslipidemia; Nephrotic syndrome; MCNS.

INTRODUCTION

Nephrotic syndrome is a common childhood glomerular disorder with an annual incidence of 2-7 per 100,000 and prevalence of 12-16 per 100,000. It is idiopathic in 95% of cases. Hyperlipidemia, a key feature of idiopathic nephrotic syndrome, occurs during active disease and resolves with reduced proteinuria. Dyslipidemia, involving altered cholesterol and lipoprotein levels, is linked to increased cardiovascular risk and renal damage. Persistent lipid abnormalities during remission raise concerns about long-term atherosclerosis and progressive renal injury. This study investigates whether serum lipid abnormalities persist in childhood nephrotic syndrome and if they predict relapse.

Aim: To study whether there is significant elevation of lipid level and is persisting in children with nephrotic syndrome.

Objective

1. To serially estimate the levels of fasting serum lipids in nephrotic syndrome at the onset and in remission, to know whether hyperlipidemia is persisting or not.
2. Correlate dyslipidemia during initial and relapse cases of nephrotic syndrome
3. To know whether persistant dyslipidemia as a predictor of relapse in initial cases of nephrotic syndrome.

MATERIAL AND METHODS

Relevance

Hyperlipidemia, common in active nephrotic syndrome, may persist during remission, raising concerns about atherosclerosis and renal injury. Identifying high-risk children via lipid profiles aids early intervention.

Study Design: Prospective - Follow up Study

Study setting and period: Conducted at Govt. TDMCH, Dept. of Pediatrics for a period of 1 year.

Sample Size: All children with nephrotic syndrome attended Govt. TDMCH pediatrics OPD for a period of 1 year were followed up for 24 weeks.

Study Population and inclusion criteria: Children with nephrotic syndrome attended at Department of Paediatrics OPD, Govt. TD Medical College Hospital, Alappuzha, with edema, low serum albumin (<2.5gm/dl) and urinary protein of more than 40mg/m2/hr or 3+/4+ protein.

Exclusion Criteria: Children with liver disorders, malnutrition, CCF, hypercholesterolemia on drugs

Methods of data collection: Relevant history and Informed consent from parents are collected in performa. Blood sample 2ml is taken by venepuncture for Fasting lipid profile and S. albumin. Serum total cholesterol: measured by Enzymatic method (Cholesterol oxidase esterase peroxidase. Normal serum cholesterol: less than 200 mg/dl). Serum Triglycerides; was measured by enzymatic method with glycerol blank (Normal **Serum Triglycerides:** less than 130 mg/dl). Serum Albumin: measured by Bromocresol green method (Normal value is 3.5 – 5.0 gm/dl). Urine Albumin done by dipstick method

Those children were followed up for 6 months. Serum albumin, fasting lipid profile and urine albumin were done at 6 weeks, 12 weeks and 24 weeks. Data entered in excel sheet and statistical analysis is done with SPSS 16 software and tools applied are chi-square test and Student's t test.

RESULTS

Out of 32 cases enrolled in the study during the study period of 1 year, 2 were steroid resistant nephrotic syndrome and 2 were lost to follow up. Twenty eight nephrotic syndrome cases were taken as sample for this study. Out of this 16 were male and 12 female

Mean age of study population was 4 ± 2.1 years .

In the study group, 23 first episode cases and 5 relapse cases were followed up for 6 months. 4 cases relapsed within 6 months of onset of nephrotic syndrome. [Table 1,2]

We observed that the mean cholesterol level at admission was (408.4 ± 99.2 mg/dl) .The Cholesterol levels were found to decrease during follow up with 50 percent children having high cholesterol at 6 weeks , 28.6 percent having high cholesterol at 12 weeks and all of them having normal cholesterol at the end of 24 weeks (Table 3).Triglyceride level at admission was found to be high in 96.4 percentage cases (Mean- 241 ± 78.8 mg/dL) with 37 % of cases having persistently high values even at the end of 6 months.

On comparing first episode and relapsers, it was found that mean cholesterol was much higher in first episode cases [(421.4 ± 101.5) v/s (348.8 ± 65.7)]. However at 6 weeks, it was observed that S. Cholesterol levels were persistently elevated in relapsers compared to first episode cases and this difference was found to be statistically significant (P value <0.05).

We also found a statistically significant association between S. Cholesterol during the first episode and likelihood of relapse. Among 4 cases who relapsed within 6 months, all had high levels of S.Cholesterol at 6 weeks and 3 had persistently high levels at 12 weeks. (P value <0.01). [Table 4, Figure 4]

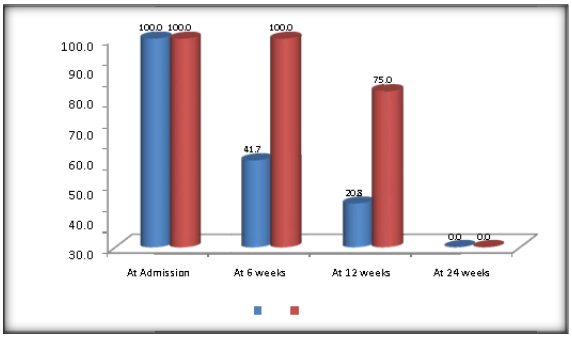

Figure 1: Comparison of total cholesterol based on relapse

Cholesterol level at different stages

Table 1: Distribution of abnormal Cholesterol at different period of time

Total Cholesterol	Count	Percent	Mean ± SD
At Admission	28	100.0	408.4 ± 99.2
At 6 weeks	14	50.0	213.1 ± 65.1
At 12 weeks	8	28.6	175 ± 28.7
At 24 weeks	0	0.0	143.6 ± 38.4

Table 2: Distribution of abnormal Triglyceride at different period of time

Triglyceride	Count	Percent	Mean ± SD
At Admission	27	96.4	241 ± 78.8
At 6 weeks	20	71.4	159.9 ± 46
At 12 weeks	17	60.7	142.5 ± 31.7
At 24 weeks	9	37.5	124.3 ± 19.2

Association of first episode and Lipid profile level

Table 3: Comparison of abnormality of total cholesterol based on episode

Total Cholesterol	First episode		Second episode	X^2 p
	Count	Percent	Count	Percent
At	23	100.0	5	100.0

Admission						
Mean ± SD	421.4 ± 101.5		348.8 ± 65.7		-	-
At 6 weeks	**9**	**39.1**	**5**	**100.0**	**6.09***	**0.014**
Mean ± SD	**210 ± 70.5**		**227.6 ± 31.8**			
At 12 weeks	5	21.7	3	60.0	2.95	0.086
Mean ± SD	170 ± 28.8		198 ± 14.1			
At 24 weeks	0	0.0	0	0.0	-	-
Mean ± SD	133.7 ± 37.2		181 ± 6.8			

*: - Significant at 0.05 level

Association of relapse and Lipid profile level

Table 4: Comparison of abnormality of total cholesterol based on relapse

Total Cholesterol	First episode		Second episode		X^2	p
	Count	Percent	Count	Percent		
At Admission	24	100.0	4	100.0		
Mean ± SD	395.6 ± 99.6		485.3 ± 58		-	-
At 6 weeks	10	41.7	4	100.0	4.67*	0.031
Mean ± SD	197.5 ± 41.8		306.8 ± 105.6			
At 12 weeks	5	20.8	3	75.0	4.93*	0.026
Mean ± SD	170.1 ± 28		204.8 ± 5.5			
At 24 weeks	0	0.0	0	0.0		
Mean ± SD	143.6 ± 38.4				-	-

*: - Significant at 0.05 level

DISCUSSION

In our study, the mean age of study population observed was 4 ± 2.1 years, which is similar to that quoted by Bagga et al,[1] 28 cases among the 30 (93.4%) initially included in the study were steroid responsive.

It was observed that mean S. cholesterol, HDL, LDL, VLDL and Triglyceride levels were significantly high at admission. Similiarly studies by Krishnaswamy et al,[44] and Sreenivas et al,[47] showed that in children with nephrotic syndrome at admission, there is generalized hyperlipidemia except HDL.

On comparing serum cholesterol at admission in first episode cases and relapse cases, it is found that first episode cases haver high mean cholesterol. It is contradictory to the study by Krishnaswamy et al,[2] and Sreenivas et al.[3] It may be due to early presentation to hospital due to parental awareness

On comparing S. Cholesterol at 6 weeks in first episode and relapse cases there was a statistically significant difference. This is in concordance with studies by Krishnaswamy et al,[2] and Sreenivas et al.[3]

In addition to this, our study also found that S. Cholesterol levels normalize at 6 months in both groups.

In our study no correlation could be commended between hyperlipidemia and hypoalbuminemia similar to findings by Heymann et al.[4] In contrast, studies by Peters et al5 and Thomas et al6 suggested an inverse correlation between lipids and serum albumin.

In Querfeld's,[7] study regarding the need for treatment of hyperlipidemia in nephrotics, 30-40% reduction in the total cholesterol was found using statins for treatment. However it has not yet been demonstrated that in patients with nephrotic syndrome, lowering cholesterol can slow the progression of renal failure. Although lowering cholesterol levels is probably beneficial for atherosclerosis prevention, the magnitude of this preventive effect is also not presently measureable. In our study all children with steroid sensitive nephrotic syndrome inspite of episode had normal cholesterol levels at the end of 6 months. Due to the absence of clearly defined therapeutic end points and concerns about possible side effects of treatment, it is not possible to make definite recomendations for treatment of hyperlipidemia in nephrotic syndrome with the limited studies in children.

In this study we found that those children going for early relapse within 6 months had persistently high cholesterol at 6 weeks and 12 weeks. This finding can help to identify those going for early relapse so that these high risk groups can be closely monitored and treated over longer duration as described in Cochrane review.[8]

CONCLUSION

From this study it is concluded that there is no persistent hyperlipidemia in nephrotic syndrome at 24 weeks in both first episode and relapse, Hence there is no rationale for treatment for hyperlipidemia in all children. As we observed, S. Cholesterol above 200mg/dl at 6 and 12 weeks can be an indicator of early relapse. These children can be identified as high risk group and kept under close follow up may be treated with tapering doses of

steroid for longer duration. Further studies are needed to prove whether prolonged steroids alter the future outcome in nephrotic syndrome. We recommend serial monitoring of Serum cholesterol level during follow up of children with nephrotic syndrome as it aids in predicting the chance of early relapse.

Limitations

Study population is too small and the study was conducted for short period. Long term outcome is not be studied. Steroids have some effect on S. cholesterol level, that is not taken into consideration. Other factors influencing early relapse like younger age, delay in attaining remission are not considered in this study. This study does not taken into consideration, the effect of transient hypercholesterolemia on large blood vessels as described in some studies, hence rationale for treatment cannot be omitted. Further studies are needed for the same.

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