International Journal of Advanced Biotechnology and Research (IJBR)
ISSN 0976-2612, Online ISSN 2278–599X,
Vol-9, Issue-2, 2018, pp503-507
http://www.bipublication.com

Research Article

A clinical study of nephrotic syndrome with special reference to serum lipid profile

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ABSTRACT

Objective: To study the lipid profile in cases of nephritic syndrome

Methodology: A prospective study which included 50 children with nephrotic syndrome, aged between 2-12 years. They were clinically examined and lipid profile was done at the onset and during remission. Thirty children without liver and kidney disorders were taken as controls.

Results: Among 50 cases studied, maximum number of cases (60%) were in the age group of 2-6 years. 29 (58%) were male and 21 (42%) were female with male:female ratio of 1.38:1. Generalised edema was present in all cases (100%), abdominal distension in 40 (80%) cases and decreased urine output in 23 (46%) cases. Ascites was present in 40 (80%) of cases. Hypoproteinemia and hypoalbuminemia was present in all patients (100%). Serum globulins were normal in all patients. Mean serum total proteins and serum albumin were significantly (0.000) lower in study group compared to control group. There was highly significant (p = .000) increase in mean serum cholesterol (420.32 ± 122.69 mg/dL), Triglycerides (297.90 ± 93.09 mg/dL), LDL (323.75 ± 100.98 mg/dL) and VLDL (61.79 ± 19.78 mg/dL). However, there was no significant (p = .234) change in HDL cholesterol. In relapse cases of nephrotic syndrome there was significantly higher serum cholesterol (p = .000), Triglycerides (p = .003), LDL (p = .000) and VLDL (p = .011) when compared to first episode.

Conclusion: The present study shows that in nephrotic syndrome, there is elevated levels of hyperlipidemia. 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.

Keywords: Serum cholesterol; Serum triglycerides; Serum albumin; Serum globulin; Serum LDL; Serum VLDL; Nephrotic syndrome

INTRODUCTION

Nephrotic syndrome is an important chronic renal disease in children, characterised by minimal change disease in the majority.[1] Hyperlipidemia is an important characteristic of idiopathic nephrotic syndrome in children and is usually observed during the active phase of the disease and disappears with the resolution of the proteinuria.[2] The persistence and severity of lipid changes in serum correlates well with the duration and frequency of the relapses, even during the remission in patients of the nephrotic syndrome. The intensity of hyperlipidemia is usually related to the severity of proteinuria and hypoalbuminemia.[3]

Hyperlipidemia increases risk of atherosclerosis and may also be important in the development of glomerulosclerosis and progressive renal injury. It may be possible to control it by using lipid lowering drugs.[3]Lipoproteins play an important role in the transport of plasma lipids; their

increase or alteration in various fractions may be responsible for hypercholesterolemia in nephroticsyndrome. There is increased total cholesterol, LDL cholesterol, VLDL cholesterol, intermediate density lipoprotein (IDL) and lipoprotein (a). HDL levels are reduced or unchanged and there is an increased LDL/HDL cholesterol ratio.[3]

In addition to these quantitative changes, the lipoprotein composition is markedly changed, with a higher ratio of cholesterol to triglycerides in the (apo-B containing) lipoproteins and an increase in the proportion of cholesterol, cholesterol ester, and phospholipids compared with proteins.[4]

Hyperlipidemia has long been recognized as a frequent metabolic abnormality in patients with the nephrotic syndrome, having first been documented in 1917.[4]

MATERIAL AND METHODS

This prospective study was conducted at Department of Pediatrics, Jinnah Hospital, Lahore from August 2016 to February 2017. 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.

Inclusion Criteria

1. Children in the age group of 2-12 years with typical features of nephrotic syndrome.
2. Patients were studied at onset of nephrotic syndrome, during remission and relapses.

Exclusion Criteria

1. Children with features that make minimal change disease less likely (hematuria, hypertension, renal insufficiency).
2. Patients with prior history of diabetes mellitus, hypothyroidism and familial hypercholesterolemia.

Blood samples were taken of all the patients and send to laboratory of lipid profile. Findings were entered in pre-designed performa along with demographic profile of the patients.

Collected was entered in SPSS version 20 and analyzed. Mean and SD was calculated for numerical data and frequencies were calculated for categorical data. T test was used to detect difference between lipid parameters of cases and controls. Chi-square test was used to detect difference. P value $\leq$ 0.05 was taken as significant.

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.

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. (Table 1)

In the present study there were 29 male and 21 female children with a male to female ratio of 1.38:1. (Table 2)In the present study generalized edema was present in all cases (100%). Abdominal distension in 80% of cases. (Table 3)In the present study, generalized edema was present in all cases 100%. Ascites in 80%. (Table 4)The mean value of serum cholesterol in study group was 420.32 mg/dL, while in control group it was 175.37 mg/dL. The p-value (.000) was highly significant. The mean value of serum triglycerides in study group was 297.90 mg/dL, while in control group it was 94.10 mg/dL. The p-value (.000) was highly significant. The mean value of serum low density lipoprotein in study group was 323.75 mg/dL, while in control group it was 107.33 mg/dL. The p-value (.000) was highly significant. The mean value of serum very low density lipoprotein in study group was 61.79 mg/dL, while in control group it was 24.00 mg/dL. The p-value (.000) was highly significant. (Table 5)

Table 1 Agewise 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

p=1.0 (NS)

Table 2 : Distribution of sex in study and control groups

	Study group		Control group		Total	
	No.	%	No.	%	No.	%
Male	29	58	19	63.3	48	60
Female	21	42	11	36.7	32	40
Total	50	100	30	100	80	100

p=0.637

Table 3 Distribution of symptoms in study group (n=50)

Symptoms	Number	Percentage	Chi-square	p-value
Generalised edema	50	100	-	-
Abdominal distension	40	80	18.00	.000
Decreased urine output	23	46	15.68	.000
Fever	15	30	9.68	.002
Cough	8	16	23.12	.000
Scrotal swelling	2	4	46.08	.000
Diarrhea	2	4	42.32	.000
Breathlessness	1	2	42.32	.000

Table 4 Distribution of signs in study group (n = 50)

Signs	Number	Percentage	Chi-square	p-value
Generalised edema	50	100	-	-
Ascites	40	80	18.00	.000
Hepatomegaly	11	22	42.32	.000
Pallor	4	8	35.28	.000
Pleural effusion	2	4	15.68	.000

Table 5 Comparison of lipid parameters between cases and controls

Group	Number	Mean	Standard deviation	t-value	p-value
Study group	50	420.32	122.69	10.84	.000 (HS)
Control group	30	175.37	18.32		
Study group	50	297.90	93.09	11.81	.000 (HS)
Control group	30	94.10	19.39		
Study group	50	323.75	100.98	11.62	.000 (HS)
Control group	30	107.33	16.10		
Study group	50	61.79	19.78	9.79	.000 (HS)
Control group	30	24.00	9.52		

DISCUSSION

The objective of the study was to study the lipid profile in cases of nephritic syndrome.Generalized edema, distension of abdomen and decreased urine output were commonest presenting complaints. Other complaints were fever, cough, scrotal swelling and breathlessness. Pitting edema, ascites, pleural effusion, hepatomegaly and pallor were commonest clinical findings. The clinical

features and findings are well compared with studies done by Balgopal et al. [5] and Shah et al.[6]

Serum cholesterol was elevated in all patients (100%). The mean serum cholesterol in study group was 420.32 ± 122.69 mg/dL whereas in control group it was 175.37 ± 18.32 mg/dL. Serum triglycerides were elevated in all patients (100%). The mean value in study group was 297.9 ± 93.09 mg/dL and in control group 94.1 ± 19.39 mg/dL. Serum LDL was elevated in all patients (100%). The mean value in study group was 323.75 ± 100.98 mg/dL and in control group 107.33 ± 16.10 mg/dL. Serum VLDL was elevated in all patients (100%). The mean value in study group was 61.79 ± 19.78 mg/dL and in control group 24 ± 9.52 mg/dL. Serum HDL was normal in 26 (52%) of cases, decreased in 11 (22%) of cases and increased in 13 (26%) of cases. The mean value was 49.48 ± 20.00 mg/dL in study group and 54.16 ± 9.61 mg/dL among control group. 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. In HDL group, p-value (0.234) did not correlate statistically. Katiyaret al.[7] studied 41 cases of nephrotic syndrome and observed that hypercholesterolemia in 100% and elevated LDL in 100% of cases. Chowdaryet al[8] studied 25 cases of nephrotic syndrome and reported that 96% of cases had hypercholesterolemia, 100% had raised LDL levels. Mehta et al[9] studied 22 cases of nephrotic syndrome and observed hypercholesterolemia in 100%, hypertriglyceridemia in 100%, elevated LDL in 100% and elevated VLDL in 80% of cases. The values of HDL were normal in 88% and decreased in 12%. Similarly Western workers studied and reported hyperlipidemia in nephrotic syndrome cases with variations in HDL levels, HDL levels may be decreased, normal or higher. Joven et al,[10]Herluf et al,[11] Gerald et al[12] and Zillerulo et al[13] have observed such results.

Mehta et al[14] studied remission patients had elevated cholesterol, triglycerides, LDL and VLDL. Similarly elevated levels of cholesterol, triglycerides, LDL and VLDL found among relapse patients. Bhandari et al[15] observed that mean values for cholesterol were 545.50 ± 162.62 mg/dL.

Appel GB et al[16] observed that mean total plasma cholesterol was 302 ± 100 mg/dL and LDL cholesterol was 215 ± 89 mg/dL, were elevated in most patients, but the HDL level was normal or low (46 ± 18 mg/dL) in 95 percent of the patients. There was an inverse relation between serum albumin and cholesterol in the present study. The p-value (.000) was highly significant.

Appel GB et al[16] observed a significant correlation between the total plasma cholesterol concentration and both the plasma albumin concentration and the plasma oncotic pressure, but not the plasma viscosity.

Warwick GL et al[17] proposed that the factors that precipitate the hyperlipidemia are a decrease in circulating albumin or plasma oncotic pressure may be responsible by stimulating a general increase in hepatic protein synthesis.

Zillerueloet al[18] observed that severity and persistence of lipid changes correlated well with duration of disease and frequency of relapses. Patients with a history of frequent relapses had significantly elevated cholesterol values during relapse (~~X~~ 354 ± 88 mg/dL) and during remission (~~X~~ 265 ± 135 SD mg/dL) compared with control (~~X~~ 162 ± 25 SD mg/dL). P-value was significant (< 0.01). A significant increase in LDL was found in patients with MCNS during relapse and remission.

Merouani et al[2] observed hyperlipidemia during the active phase of the disease and disappeared with resolution of the proteinuria and was persistently abnormal in frequently relapsing children and suggested close monitoring of lipid levels during the remission of nephrotic syndrome especially in those with frequent relapses, to select high risk patients.

Tsukaharaet al[19] observed that children with frequently relapsing nephrotic syndrome have prolonged periods of hypercholesterolemia, even during clinical remission. There is a rationale for treatment, since dyslipidemia may contribute to

the development of atherosclerosis and the progression of chronic renal failure.Querfeld U[20] used statins in his study and observed 30-40% reduction in the total cholesterol. However, the benefits of treatment with lipid lowering drugs have not been proven in children. Short term studies in adults have documented safety and efficacy of lipid lowering agents.

BuyokcelikM et al[21] observed significant reduction in the total cholesterol with statins in adult patients with nephrotic syndrome. Prospective controlled studies in children evaluating efficacy and safety of lipid lowering drugs are needed.

CONCLUSION

The present study shows that in nephrotic syndrome, there is elevated levels of hyperlipidemia. There is generalized 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.

REFERENCES

1. ArvindBagga, MuktaMantan. Nephrotic syndrome in children. Indian J Med Res 2005; 122:13-28.
2. Merouani A, Levy E, Mongeall JG, Robitaille P, Lambert M, Delvin EE. Hyperlipidemic profiles during remission in childhood idiopathic nephrotic syndrome. ClinBiochem 2003; 36(7):571-4.
3. Srivastava RN, ArvindBagga. Pediatric Nephrology. 4thed. New Delhi, India: Jaypee Brothers, Medical Publishers (P) Ltd; 2005. p. 161-200.
4. David C Wheeler, David B Bernard. Lipid abnormalities in the nephrotic syndrome: Causes, consequences and treatment. Am J Kidney Dis 1994; 23:331-46.
5. Balgopal R, Krishnan S, Vijaya. Nephrotic syndrome in children. Antiseptic 1974; 71:1-7.
6. Shah, Betkerur. Nephrotic syndrome in childhood. Indian J Med Asso 1969;52:215-8.
7. Katiyar GP Singh, Agarwal. Study of serum lipid pattern in nephrotic syndrome in children. Indian Paediatrics 1976; 13:83-7.
8. Chowdhary VP, Ghai OP. Peritonitis in nephrotic syndrome. Indian Paediatrics 1977; 14(5):406.
9. Mehta K, Ali UD. Recent advances in minimal change nephrotic syndrome. Indian J Paediatr 1985; 52:579.
10. Joven J, Villabona C, Vilella E, Masana L, Alberti R, Valles M. Abnormalities of lipoprotein metabolism in patients with the nephrotic syndrome. N Engl J Med. 1990; 323(9):579-83.
11. Herluf J. Plasma protein and lipid pattern in nephrotic syndrome. ActaSca Med 1967; 182:465.
12. Gerald BA, Conrad BB, Shuchein. Hyperlipidemia of nephrotic syndrome. The N Engl J Med 1985; 312:1544.
13. Gaston Zilleruelo, Sungh LH, Michael. Persistence of serum lipid abnormalities in children with idiopathic nephrotic syndrome. J Paediatr 1984; 61:104.
14. Mehta K, Ali UD. Recent advances in minimal change nephrotic syndrome. Indian J Paediatr 1985; 52:579.
15. Bhandari, Mandowara. Lipoprotein profile in nephrotic syndrome. Indian Paediatrics 1980; 17:416-9.
16. Appel GB, Blum CB, Chien S, Kunis CL, Alice S. The hyperlipidemia of the nephrotic syndrome. N Engl J Med 1985; 312:1544-8.
17. Warwick GL, Caslake MJ, Jones JMB, Dagen M, Packard CJ, Shepherd J. Low density lipoprotein metabolism in the nephrotic syndrome. Metabolism 1990; 39:187-92.
18. Gaston Zilleruelo, Sungh LH, Michael. Persistence of serum lipid abnormalities in children with idiopathic nephrotic syndrome. J Paediatr 1984; 61:104.
19. Tsukahara H, Harukis, Hiroka M, Horic, Sudo M. Persistent hypercholesterolemia in frequently relapsing steroid responsive nephrotic syndrome. J Paediatr Child Health 1997; 33(3):253-5.
20. Querfeld U. Should hyperlipidemia in children with nephrotic syndrome be treated ?PediatrNephrol 1999; 13(1):77-84.
21. Buyukcelik M, Anarat A, Noyas A, Ozcl A, Anarat R, Dikmen M et al. The effects of gemfibrozil on hyperlipidemia in children with

persistent nephrotic syndrome. Turk J Pediatr 2002; 44(1):40-4.