

Lipid Profile Abnormalities in Nephrotic Syndrome

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Abstract

Background: Nephrotic syndrome is a set of indications that include protein in the urine, low blood protein levels, high cholesterol levels, high triglyceride levels, and swelling. Nephrotic syndrome is affected by changed disorders that damage the kidneys. This impairment leads to the release of too much protein in the urine. Hyperlipidemia is a common finding in nephrotic syndrome. There is increased total Cholesterol, LDL, VLDL and low or normal HDL. It has been noted that certain factors like diet, malnutrition, genetic traits etc., are known to alter the frequency and severity of lipid pattern. The Indian patient has a different dietary, constitutional and genetic background. An attempt was also made to correlate the degree of proteinuria and hypoproteinemia, with the rise in serum lipid values in cases of nephrotic syndrome.

Methods: This is a Cross sectional study in which 30 Normal patients and 30 patients. The Serum lipid profiles of the patients were evaluated.

Results: There was a significant increase in Total cholesterol, HDL, LDL, VLDC & TG in Nephrotic patients when compared to Controls. The study finding

conclude that the serum lipid profile shoed noticeable increase in the nephrotic syndrome in Indian patients.

Conclusion: It also observed that nephrotic patients are having hyperlipidaemia. This hyperlipidaemia may progress in to the cardiovascular diseases. Hence the lipid profile in the nephrotic syndrome must be monitored for better management of the diseases.

Keywords: Lipid profile, Nephrotic syndrome in children, Hyperlipidemia

Introduction

Nephrotic syndrome is a general kidney disorder categorized by three signs of disease: large proteinuria, hypoalbuminemia, and edema.¹ Nephrotic syndrome is a group of symptoms that include protein in the urine, low blood protein levels, high cholesterol levels, high triglyceride levels, and swelling. Nephrotic syndrome is caused by different disorders that damage the kidneys. This damage leads to the release of too much protein in the urine. Common primary causes of nephrotic syndrome include kidney diseases such as minimal-change nephropathy, membranous nephropathy, and focal glomerulosclerosis. Secondary causes include systemic diseases such as diabetes mellitus, lupus erythematosus, and amyloidosis. Congenital and hereditary focal

glomerulosclerosis may result from mutations of genes that code for podocyte proteins, including nephrin, podocin, or the cation channel 6 protein. Nephrotic syndrome can result from drugs of abuse, such as heroin. Nephrotic syndrome is usually accompanied by retention of water and sodium. The degree to which this occurs can vary between slight edema in the eyelids that decreases during the day, to affecting the lower limbs, to generalized swelling, to full blown anasarca.² Nephrotic syndrome is characterized by large proteinuria (>3.5 g per 1.73 m² body surface area per day,³ or > 40 mg per square meter body surface area per hour in children), hypoalbuminemia (< 2.5 g/dl), hyperlipidaemia, and edema (which is generalized and also known as anasarca or dropsy) that begins in the face. Lipiduria (lipids in urine) can also occur, but is not essential for the diagnosis of nephrotic syndrome. Hyponatremia also occurs with a low fractional sodium excretion. Hyperlipidaemia is caused by two factors: 1 Hypoproteinemia stimulates protein synthesis in the liver, resulting in the overproduction of lipoproteins. 2 Lipid catabolism is decreased due to lower levels of lipoprotein lipase, the main enzyme involved in lipoprotein breakdown.⁴ Cofactors, such as apolipoprotein C2 may also be lost by increased filtration of proteins.

Methods

Data included 30 cases of children with nephrotic syndrome, admitted for the first time in the pediatric hospital S.P. Medical College Hospital, Bikaner, Rajasthan, for this prospective study. 30 children without liver and kidney disorders were taken as control group. 30 nephrotic syndrome cases were clinically examined and following investigations were performed in each case, before steroid therapy (ISKDC

Regimen), after one month of steroid therapy and at the end of therapy.

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

Exclusion Criteria: • Children with liver disorders.

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

Lipid profile measured following methods

1) Serum total cholesterol: was measured by Enzymatic method Normal serum cholesterol: 150-250 mg/dl

2) Serum HDL cholesterol: was measured by “Phosphotungstate method. Normal HDL – Cholesterol : 30 – 70 mg/dl.

3) Serum LDL cholesterol: If the value of Triglycerides is known, LDL-cholesterol can be calculated based on Friedewald’s equation. LDL – chol mg/dl: Total CHOL – TRIGLYCERIDES – HDL – CHOL 5

4) Serum Triglycerides; was measured by enzymatic colorimetric method Normal Serum Triglycerides: Male: 60-165 mg/dl Female: 40-140 mg/dl

5) Serum VLDL : Was measured by Enzymatic method.

Results and Discussion

The 30 Normal patients & 30 Nephrotic syndrome patients were studied.

Table 1: Observed Serum Levels of lipo proteins

	Group I: Normal patients	Group II : Nephrotic syndrome patients
Total Cholesterol (mg/dl)	180±27	340±120
High Density Lipids (mg/dl)	45±6	102±8
Low Density	123±20	180±40

Lipids (mg/dl)		
Very Low Density Lipid (mg/dl)	46±5	50±7
Triglycerides (mg/dl)	90±15	170±20

The above data showed significant increase level of the lipo proteins. The level of the cholesterol, HDL, LDL & triglycerides is found to be markedly increased. The VLDL levels do not show any marked changes. This concludes that hypercholesterolemia in the nephrotic patients. The hypercholesterolemia observed is also previously reported in nephrotic syndrome study Krishnaswamy D et al, Appel G.B. et al and Alexander J.H et al showed the same findings.⁵⁻⁷

The level of the HDL decrease is also reported in previous studies. Adekoya A.O showed the same results of the decrease in levels of the HDL⁸ The increased LDL can be explained by severe reduction of hepatic LDL receptor protein abundance in nephrotics despite normal LDL receptor mRNA abundance and gene translation rate.⁹

Conclusion

The study findings conclude that the serum lipid profile showed noticeable increase in the nephrotic syndrome in Indian patients. It is also observed that nephrotic patients are having hyperlipidaemia. This hyperlipidaemia may progress into cardiovascular diseases.

Hence the lipid profile in the nephrotic syndrome must be monitored for better management of the diseases.

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