ISSN: 0975-1556

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2021; 13(3); 09-13

Original Research Article

Serum Lipid Profile Abnormalities in Nephrotic Syndrome Patients

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Received: 11-05-2021 / Revised: 16-06-2021 / Accepted: 29-06-2021
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Conflict of interest: Nil

Abstract

Aim: To evaluate serum lipid profile related with nephrotic syndrome. **Methods**: This observational study was carried out in the Department of Biochemistry, Nalanda Medical College and Hospital Patna, Bihar, India from July 2019 to February 2020. Total 200 patients were included in this study and divided into two groups. Among them 100 diagnosed nephrotic syndrome patients represented as case or study groups and 100 age and sex matched healthy patient's individuals represented as control. **Results:** The mean±SD age of case or Study group and control were 35.47±5.76 years and 38.76±5.77years respectively. No statistically significant difference was found regarding age of the case and control groups ($p>0.05$). Mean±SD of serum total cholesterol (Tc), TAG, HDLC, LDL-C of Study group and control were 277.20±34.81mg/dL, 169.77±19.54mg/dL, 22.91±4.39mg/dL, 221.76±33.20mg/dL and 164.17±22.27mg/dL, 125.78±21.77mg/dL, 36.5±7.11mg/dL, 104.31±35.71mg/dL respectively. Serum Tc, TAG, LDL-C levels were significantly higher in cases than the control ($p<0.0001$) but serum HDL-C level was significantly lower in cases than the control ($p<0.0001$). **Conclusions**: Routine check-up of lipid profile will help to prevent the development of cardiovascular and cerebrovascular complications in adult nephrotic syndrome patients.

Keywords: abnormalities, Hypoalbuminemia, Nephrotic Syndrome, Proteinuria.

Introduction

Nephrotic syndrome (NS) is a multi-factorial clinical condition characterized by increased glomerular permeability with consequent massive proteinuria. There is a variable tendency towards developing edema, hypoalbuminemia and hyperlipidaemia. The severity of lipid abnormalities also correlates with the degree of protienuria and a common complication in patients with chronic kidney disease and Nephrotic syndrome is proteinuria>3g/day. The specific causes of nephrotic syndrome include minimal-change nephropathy, focal glomerulosclerosis, and membranous nephropathy. It can also result from

systemic diseases that affect other organs in addition to the kidneys, such as diabetes, amyloidosis, and lupus erythromatous[1,2]. Although pathophysiological aspects of hyperlipidemia have not been completely identified, hypoalbuminemia, increased lipoprotein synthesis and decreased lipoprotein lipase activity are described by various workers[3]. Two types of dyslipidemia are mainly hypercholesterolemia, and combined hyperlipidemia[4]. The mechanisms responsible for raised lipid concentrations in the nephrotic syndrome are not fully understood. However, it has been proposed that hypoalbuminemia induces the over synthesis of lipoproteins[5]. Increased hepatic lipoprotein synthesis, in response to low plasma oncotic pressure, as a consequence of the urinary loss of an as-yet unidentified regulatory substance, or both, is thought to play a key pathogenetic part[6]. The concentration and composition of most classes of lipoproteins are affected, resulting in the accumulation of lipoproteins rich in cholesterol and phospholipids. Hyperlipidemia is found in almost all patients with nephrotic syndrome. High cholesterol level is a risk factor for atherosclerosis and is well documented[7]. The present study was designed to study the derangement of serum lipids along with prevalence of nephrotic syndrome. Abnormalities in nephrotic syndrome is not only involved in the cardiovascular risk but also accelerates the progression of glomerular dysfunction[8]. Glomerular disease is a common cause of end stage renal disease (ESRD) and comprises 25-45% cases of ESRD in developing nations including India[9]. These formidable enemies of health are joining forces to impose a double burden of disease. Limited published data has yet been found regarding this content, though several studies have been done in abroad to establish the relationship between serum lipid profile and nephrotic syndrome. So, the present study was designed in a small group of Indian population to evaluate serum lipid profile related with nephrotic syndrome.

Material and methods

This observational study was carried out in the Department of Biochemistry, Nalanda Medical College and Hospital Patna, Bihar, India from July 2019 to February 2020.The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical clearance.

Methodology

Total 200 patients were included in this study and divided into two groups. Among them 100 diagnosed nephrotic syndrome patients represented as case or study groups and 100 age and sex matched healthy patient's individuals represented as control. Cases were selected from diagnosed and admitted patients in department of Nephrology of Patna Medical College Hospital on the basis of inclusion and exclusion criteria.

All the biochemical activity performed in the department of biochemistry. Along with the baseline information, 3 ml of fasting (at least 12 hours devoid of meal) blood sample were collected from all study subjects and analyzed for total cholesterol (Tc), triacylglycerol (TAG), high density lipoprotein (HDL-C) by semi-automated biochemical analyzer. Low density lipoprotein (LDL-C) was calculated by Friedwald equation.

Statistical analysis

The recorded data was compiled entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA). Descriptive statistics included computation of percentages, means and standard deviations.

Results

Table 1: gender wish distribution of population

Gender	N=200	Percentage
Male	130	65
Female	70	35

Table 2: Distribution and comparison of age (years) between study group and control (N=200)

	Study group	Control	P value
Age in years	35.47±5.76	38.76±5.77	0.0706

Table 3: Distribution and comparison of serum lipid profile in Study group and control (N=200)

Parameter	Study group (n=100)	Control (n=100)	P value
(mg/dL)			
Tc	277.20±34.81	164.17 ± 22.27	<0.0001
TAG	169.77±19.54	125.78±21.77	<0.0001
HDL-C	22.91±4.39	36.5±7.11	<0.0001
LDL-C	221.76±33.20	104.31±35.71	<0.0001

Discussion

This case control study was designed to observe various changes of biochemical parameters of lipid profile in nephrotic syndrome patients comparing to healthy patients. In nephrotic syndrome, hypoproteinemia stimulates protein synthesis in the liver, resulting in the over production of lipoproteins. On the other hand, lipid catabolism is decreased due to lower levels of lipoprotein lipase, the main enzyme involved in lipoprotein breakdown. These two pathophysiological phenomena are involved in dyslipidaemia in adult patients with nephrotic syndrome[2]. The result of this study showed that the components of serum lipid profile in study group and control had highly significant difference. The mean±SD of serum total cholesterol of study group was 277.20±34.81mg/dL and that of control was 164.17±22.27mg/dL respectively. Serum total cholesterol level was significantly higher in cases than the control (p<0.0001). This finding was consistent with the finding reported by Adekoya et al[10]. The mean±SD of TAG in study group and control were 169.77±19.54mg/dL and 125.78±21.77 mg/dL respectively. The serum TAG level was significantly higher in study group than in control (p<0.0001). It may be due to increased synthesis of VLDL in liver and decreased lipoprotein lipase and hepatic triacylglycerol lipase activity in nephrotic syndrome[11]. The mean±SD of serum LDL-C in case and control were 221.76±33.20mg/Dl and 104.31±35.71 mg/dL respectively. The serum LDL-C was significantly higher in cases than the control (p<0.0001).

This finding was also consistent with the finding reported by Adekoya et al.[10] and Nandedkar et al.[12]. The mean±SD of serum HDL-C level in case and control were 22.91±4.39mg/dL and 36.5±7.11 mg/dL respectively. The serum HDL-C level was significantly lower in cases than the control (p<0.0001). This finding was similar to the result of a study performed by Penget al.[13] and this is in accordance with the findings documented in some other studies[14,15]. Two other studies

performed in India were found to report similar findings. The study done by Sanjay et al.[16] reported 54 cases having mean±SD 24-hour urinary total protein 5.4±1.3 gm/day, their mean±SD serum total cholesterol level was 268.3±173.3 mg/dL. A cross sectional study performed by Pandey and Prasad[17] among 50 cases of adult nephrotic syndrome patients showed markedly increased mean±SD of serum total cholesterol (410±120 mg/dL), LDL (190±40 mg/dL), and TAG (178±20 mg/dL) level.

Conclusion

The nephrotic syndrome is well associated risk factor for cardiovascular and cerebrovascular diseases. Therefore, nephrotic syndrome patients should undergo regular screening with lipid profile for the early detection of abnormalities and should be treated accordingly to prevent associated complications and better management of patients.

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