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Biochemistry

ASSOCIATION BETWEEN DYSLIPIDAEMIA AND NEPHROTIC SYNDROME

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ABSTRACT **Background:** The Nephrotic syndrome is a relatively common clinical disease which results in hyperlipidemia and profound alterations in lipid and lipoprotein metabolism characterized by massive proteinuria, hypoalbuminaemia and oedema. Dyslipidaemia have an important biochemical basis in the disease process of adult nephrotic syndrome. Lipid abnormalities in nephrotic syndrome is involved in cardiovascular risk and also accelerates the progression of glomerular dysfunction. **Aims and Objectives:** To find out the association between serum lipid profile and nephrotic syndrome in adult. **Materials and methods:** Present study was carried out in the department of Biochemistry, Government Medical College, Banda (U.P.) during period of July 2017 to June 2018 to evaluate the association of serum lipid profile in adult patients with nephrotic syndrome. Eighty (80) study subjects were included, among them forty (40) were diagnosed adult nephrotic syndrome patients selected as case and forty (40) were age and sex matched healthy adult individuals selected as control. Serum lipid profile and serum albumin were estimated for both case and control. All the statisticalanalysis were done by using SPSS for Windows version 20.0. **Results:** In the study Mean±SD of serum total cholesterol (TC), triacylglycerol (TAG), high density lipoprotein (HDL-C), and low density lipoprotein (LDL-C) of case were 288.23±35.67 mg/dl, 174.58±18.86 mg/dl, 23.71±4.58 mg/dl and 230.16±34.28 mg/dl respectively and that of control were 171.04±24.36 mg/dl, 129.56±23.44 mg/dl, 37.52±7.02 mg/dl and 103.58±36.83 mg/dl respectively. Serum TC, TAG, LDL-C levels were significantly higher in cases than the control ($p<0.0001$) and serum HDL-C level was significantly lower in cases than the control ($p<0.0001$). **Conclusion:** In the study it is concluded that dyslipidaemia is associated with adult nephrotic syndrome. Routine check-up of lipid profile will help to prevent the development of cardiovascular complications in adult nephrotic syndrome patients.

KEYWORDS : Dyslipidaemia, Nephrotic Syndrome, Cardiovascular Risk

INTRODUCTION:-

The Nephrotic syndrome is a relatively common clinical disease with multiple causes characterized by increased glomerular permeability and manifested by massive proteinuria.[1] Generally, it is represented as excretion of urine total protein more than 3.5 gm/day, low serum albumin level (<2.5 gm/dl) and peripheral oedema.[2] Nephrotic syndrome can affect any age, although it is found with a ratio of adults to children of 26:1.[3] Nephrotic syndrome is chronic relapsing disease. Relapse is also higher in children. This frequent or infrequent relapse in the nephrotic syndrome may continue even in adult age.[4] Lipid abnormalities is an important biochemical feature in nephrotic syndrome . Although pathophysiological aspects of this lipid abnormalities have not been completely identified, hypoalbuminaemia, increased lipoprotein synthesis and decreased lipoprotein lipase activity are described as the important casual factor.[5] In nephrotic syndrome, generally, when oedema regresses, lipid abnormalities tend to being normal but in some cases it may continue after the oedema has disappeared. However it may persist in some cases, leading to increased risk of atherosclerosis in later life.[6] The magnitude of the most pronounced secondary changes in lipoprotein metabolism in nephrotic syndrome patients correlates with the severity of the syndrome.[7] Elevation of serum lipid concentrations is an independent risk factor for coronary artery disease and cardiovascular disease. Concurrent elevation of lipid profile increases these risks.[8] In nephrotic syndrome, one of the main causes of the death is cardiovascular along with chronicity of the syndrome.[9]

Dyslipidaemia in nephrotic syndrome is not only involved in the cardiovascular risk but also accelerates the progression of glomerular dysfunction.[10] Glomerular disease is a common cause of end age renal disease (ESRD) and comprises 25-45% cases of ESRD in developing nations including India.[11] 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 to evaluate biochemical parameters in serum lipid profile related with adult nephrotic syndrome.

MATERIALS AND METHODS:-

This observational case control study was carried out in the Department of Biochemistry, Government Medical college, Banda (U.P.) from July 2017 to June 2018 with all ethical norms to evaluate the associationship of dyslipidaemia among the adult patients with nephrotic syndrome. For this purpose eighty (80) adult persons enrolled as study subjects. A written consent was obtained from all participating subjects, who were then explained the study design and purpose of the study. Among them forty (40) diagnosed nephrotic syndrome patients represented as case and forty (40) age and sex matched healthy adult individuals represented as control. Cases were selected from diagnosed and admitted patients in Medical Ward of Associated Hospital of Government Medical College, Banda (U.P.) on the basis of inclusion and exclusion criteria. Along with the baseline information 3 ml of fasting blood sample collected from all study subjects and analyzed for total cholesterol (TC), triacylglycerol (TAG), high density lipoprotein (HDL-C) by semiautomated biochemical analyzer. Low density lipoprotein (LDL-C) was calculated by Friedwald equation.[12]

All the results were statistically analyzed by using the SPSS version 20.0 for Windows. All data were processed to compute mean and standard deviation and expressed as Mean±SD. Differences of Mean among two groups were compared with unpaired Student's t-test. Categorical variables were analyzed by Chi-square test. The significance test was done at 95% confidence level.

RESULTS:-

Table 1 showed the distribution and comparison of age between case and control. Mean±SD age of case and control were 34.68±6.42 years and 37.84±6.93 years respectively. No statistical significant difference was found regarding age of case and control groups ($p>0.05$).

Table 1 Distribution and comparison of age (years) between case and control (N=80)

Study Subjects	Age in Years Mean±SD	P value
Case (n=40)	34.68±6.42	0.0624
Control (n=40)	37.84±6.93	

Table 2 presented the distribution and comparison of serum lipid profile in case and control. Mean±SD of serum total cholesterol (TC), TAG, HDL-C, LDL-C of case and control were 288.23±35.67 mg/dl, 174.58±18.86 mg/dl, 23.71±4.58 mg/dl, 230.16±34.28 mg/dl and 171.04±24.36 mg/dl, 129.58±23.47 mg/dl, 103.58±36.83 mg/dl respectively. Serum TC, TAG, LDL-C levels were significantly higher in cases than control ($p<0.0001$) but serum HDL-C level was significantly lower in cases than control ($p<0.0001$).

Table 2 Distribution and comparison of serum lipid profile in case and control (N=80)

Biochemical Parameters (mg/dl)	Study Subjects (Mean±SD)		P value
	Case (n=40)	Control (n=40)	
TC	288.23±35.67	171.04±24.36	P<0.0001
TAG	174.58±18.86	129.56±23.44	P<0.0001
HDL-C	23.71±4.58	37.52±7.02	P<0.0001
LDL-C	230.16±34.28	103.58±36.83	P<0.0001

DISCUSSION:-

This case control study was designed to observe various changes in biochemical parameters of lipid profile in adult nephrotic syndrome patients comparing to healthy adults. In nephrotic syndrome, hypoproteinaemia accelerates 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 pathophysiological phenomenons are involved in dyslipidaemia in adult patients with nephrotic syndrome.[6]

The results of the study showed that the parameters of serum lipid profile in case and control had highly significant difference. In the study Mean±SD of serum total cholesterol of case was 288.23±35.67 mg/dl and that of control was 171.04±24.36 mg/dl respectively. Serum total cholesterol level was significantly higher in cases than control (p<0.0001). This finding was consistent with the finding reported by Adekoyaet al.[13] The Mean±SD of TAG in cases and control were 174.58±18.36 mg/dl and 129.56±23.44 mg/dl respectively. The serum TAG level was significantly higher in cases than 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.[14] The Mean±SD of serum LDL-C level in case and control were 230.16±34.28 mg/dl and 103.58±36.83 mg/dl respectively. The serum LDL-C was significantly higher in cases than control (p<0.0001). This finding was also consistent with the finding reported by Adekoyaet al[13] and Nandekar et al.[15] The Mean±SD of serum HDL-C level in case and control were 23.71±4.48 mg/dl and 37.52±7.02 mg/dl respectively. The serum HDL-C level was significantly lower in cases than control (p<0.0001). This finding was similar to the results of a study performed by Peng et al.[16]

Two other studies performed in India (Gwalior and Patna) were found to report similar findings. The study done by Sanjay et al[17] at Gwalior 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 268.30±38.43 mg/dl. A cross sectional study performed by Pandey and Prasad [18] at Patna among 50 cases of adult nephrotic syndrome patients showed markedly increased Mean±SDof serum total cholesterol (410±44 mg/dl), LDL-C (190±40 mg/dl), and TAG (178±20 mg/dl) level.

CONCLUSION:-

From the present study, it can be concluded that dyslipidaemia is associated with nephrotic syndrome in adult. Abnormalities in lipid profile is a well established risk factor for cardiovascular diseases. Therefore adult nephrotic syndrome patients should undergo regular screening with lipid profile for the early detection of dyslipidaemia and should be treated accordingly to prevent the complications and better management of patients.

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