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# The correlation between lipid profile and serum albumin level in adult nephrotic syndrome patients in Bangladeshi population

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## Abstract

**Background:** The nephrotic syndrome is a constellation of abnormalities that includes massive proteinuria, hypoalbuminemia and edema. Lipid abnormalities has an important biochemical basis in the disease process of adult nephrotic syndrome patients. Dyslipidemia in nephrotic syndrome involved in the cardiovascular risk and also accelerates the progression of glomerular dysfunction. **Objective:** 1. To determine the lipid profile of patients with nephrotic syndrome. 2. To determine the relationship between TC, TAG, HDL-C and LDL-C with serum albumin. **Methods:** This observational study was carried out in the Department of Biochemistry, Dhaka Medical College, Dhaka, during the period of July 2013 to June 2014. A total number fifty (50) study subjects, age range from 20-50 years of both sexes were selected. Serum lipid profile and S. albumin were assessed. Mean values of the variables were determined. Correlations between variables were determined by Pearson's correlation test by using SPSS for windows version 20.0. For all the statistical analysis  $p < 0.05$  was considered as significant. **Result:** Mean ( $\pm$ SD) values of serum total cholesterol (Tchol), TAG, HDL-C and LDL-C in adult nephrotic syndrome patients were  $288.23 \pm 35.67$ ,  $174.53 \pm 18.86$ ,  $23.71 \pm 4.58$  and  $231.16 \pm 34.28$  respectively. Mean value of serum albumin levels in study subjects was  $1.87 \pm 0.54$ . Significant ( $p < 0.05$ ) negative correlation was found between S. albumin and Tchol ( $r = -0.387$ ), TAG ( $r = -0.325$ ), LDL-C ( $r = -0.321$ ) and significant ( $p < 0.05$ ) positive correlation was found between S. albumin and HDL-C ( $r = 0.233$ ). **Conclusion:** Dyslipidemia is associated with adult nephrotic syndrome and possess a significant relationship between dyslipidemia and hypoalbuminemia which could predispose them to develop coronary artery disease.

**Keywords:** Nephrotic syndrome, Dyslipidemia

## Introduction

Nephrotic syndrome is a clinical entity with multiple causes characterized by increased glomerular permeability and manifested by massive proteinuria.<sup>1</sup> Nephrotic syndrome is represented as urinary total protein excretion more than 3.5 gm/day, low serum albumin level ( $< 2.5$ gm/dl) and peripheral edema.<sup>2</sup> Nephrotic syndrome can affect any age, although it is found with a ratio of adults to children of 26:1.<sup>3</sup> The incidence of nephrotic syndrome is 90-100/million in the Indian subcontinent including Bangladesh.<sup>4</sup> Nephrotic syndrome is a chronic relapsing disease. Relapse is also higher in

children of Bangladesh which is 36.4%. This frequent or infrequent relapse in the nephrotic syndrome may continue even in adult age.<sup>5</sup> Lipid abnormalities have an important biochemical abnormalities in nephrotic syndrome. Although pathophysiological aspects of abnormal lipid metabolism have not been completely identified, hypoalbuminemia, increases lipoprotein synthesis and decreases lipoprotein lipase activity are described as the important causal factor.<sup>6</sup>

In nephrotic syndrome, generally, when edema regresses, lipid abnormalities tends to being normal but in some cases it may continue after the

edema has disappeared. However it may persist in some cases, leading to increased risk of atherosclerosis in later life.<sup>7</sup> The magnitude of the most pronounced secondary changes in lipoprotein metabolism in nephrotic syndrome patients correlates with the severity of the syndrome.<sup>8</sup>

Dyslipidemia in nephrotic syndrome not only involved in the cardiovascular risk but also accelerates the progression of glomerular dysfunction.<sup>9</sup> Elevation of serum lipid concentrations is an independent risk factor for coronary artery disease and cerebrovascular disease. Concurrent elevation of lipid profile increase these risks.<sup>10</sup>

Abnormalities in serum lipid profile has been paralleled by an increase in the incidence of the disease. Glomerular disease is a common cause of ESRD (End stage renal disease) and comprises 25-45% cases of ESRD in developing nation including Bangladesh.<sup>11</sup> 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 Bangladeshi population to evaluate the correlation between serum albumin and biochemical parameters in serum lipid profile related with adult nephrotic syndrome.

## Materials And Methods

This observational study of one year duration from July 2013 to June 2014 was designed to evaluate the correlation of dyslipidemia with serum albumin level among the adult patients with nephrotic syndrome. The study protocol was approved by the institutional Ethical committee. Informed written consent was obtained from all the study subjects. Study sample was consists of fifty (50) adult nephrotic syndrome patients who were selected as diagnosed and admitted patients

in Department of Nephrology of Dhaka Medical College Hospital on the basis of following criteria: serum albumin  $<2.5$  gm/dl, UTP is  $>3.0$  gm/day with generalized edema.

Along with the baseline information, 3 ml of fasting (at least 12 hours devoid of meal) blood sample were collected and analyzed for Tchol, TAG, LDL-C, HDL-C and serum albumin level for all participants of the study. Total cholesterol (Tchol), triacylglycerol (TAG), high density lipoprotein (HDL-C) were assayed by semi automated biochemical analyzer. Low density lipoprotein (LDL-C) was calculated by Friedwald equation.<sup>12</sup>

Statistical analysis was performed by using the SPSS version 20.0 for windows. All data were processed to compute mean and standard deviation and expressed as mean $\pm$ SD. Pearson's correlation coefficients were used to analyze linear correlations between variables. For all the statistical analysis  $p<0.05$  were considered as significant.

## Results

Table- I shows the baseline information of study subjects. The mean  $\pm$  SD age of nephrotic syndrome patients was  $34.62\pm6.45$ . Among the total study subjects 21 (42%) were male and 29 (58%) were female. The mean  $\pm$  SD of systolic and diastolic blood pressure of nephrotic syndrome patients were  $133.52\pm7.56$  and  $85.16\pm7.36$  respectively. Mean $\pm$ SD of serum albumin of study subjects was  $1.87\pm0.54$ .

Table-II shows the mean $\pm$ SD of serum lipid profile in adult nephrotic syndrome patients comparing to normal range. The mean $\pm$ SD of serum Tchol, TAG, HDL-C and LDL-C were ( $288.23\pm35.67$ ), ( $174.53\pm18.86$ ), ( $23.71\pm4.58$ ) and ( $231.16\pm34.28$ ) respectively.

Table-III shows the correlation between serum albumin level and the four components of serum lipid profile of study subjects. Which implies that, significant ( $p<0.05$ ) negative correlation was

found between S. albumin and Tchol ( $r = -0.387$ ), TAG ( $r = -0.325$ ), LDL-C ( $r = -0.321$ ) and significant ( $p < 0.05$ ) positive correlation was found between S. albumin and HDL-C ( $r = 0.233$ ).

**Table-I :** Base line information of study subjects (n=50)

| Base line informations                      | Adult patients with nephrotic syndrome (Mean $\pm$ SD) |
|---------------------------------------------|--------------------------------------------------------|
| Age (yrs)                                   | 34.62 $\pm$ 6.45                                       |
| Sex: Male, n=21 (42%)<br>Female, n=29 (48%) |                                                        |
| Systolic blood pressure (mm of Hg)          | 133.52 $\pm$ 7.56                                      |
| Diastolic blood pressure (mm of Hg)         | 85.16 $\pm$ 7.36                                       |
| Serum albumin (gm/dl)                       | 1.87 $\pm$ 0.54                                        |

**Table-II :** Serum albumin level and lipid profile in adult nephrotic syndrome (NS) patients (n=50)

| Parameters (mg/dl) | Adult NS patients (Mean $\pm$ SD) | Normal range [Unit (mg/dl)] <sup>13</sup> |
|--------------------|-----------------------------------|-------------------------------------------|
| S. Tchol           | 288.23 $\pm$ 35.67                | 180-200                                   |
| S. TAG             | 174.53 $\pm$ 18.86                | 100-150                                   |
| S. HDL-C           | 23.71 $\pm$ 4.58                  | 40-60                                     |
| S. LDL-C           | 231.16 $\pm$ 34.28                | 100-130                                   |

**Table-III :** Correlation between S. albumin and lipid profile in adult nephrotic syndrome (NS) patients (n=50)

| Variables  |         | r values | p values |
|------------|---------|----------|----------|
| (gm/dl)    | (mg/dl) |          |          |
| S. albumin | Tchol   | 0.387    | 0.0026*  |
|            | TAG     | 0.325    | 0.0086*  |
|            | HDL-C   | 0.233    | 0.0487*  |
|            | LDL-C   | 0.321    | 0.0076*  |

Level of significance,  $p < 0.05$  \* significant.

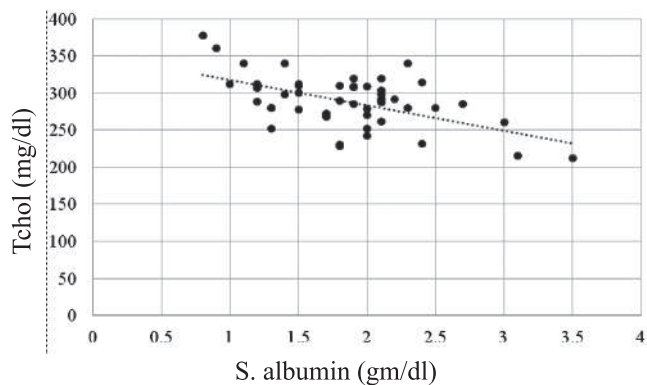


Fig. I: Correlation between S. albumin & Tchol in adult NS patients

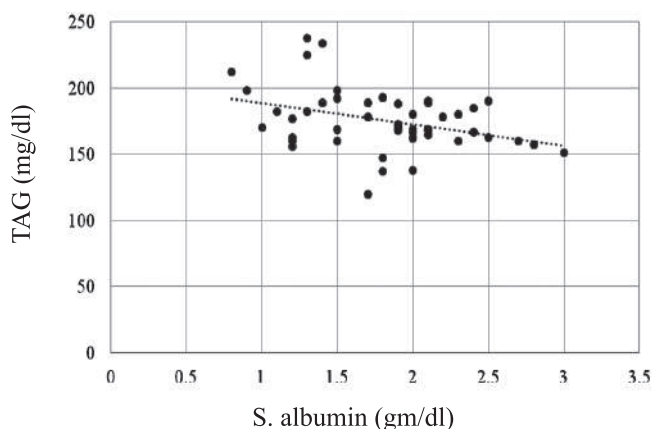


Fig. II: Correlation between S. albumin & TAG in adult NS patients

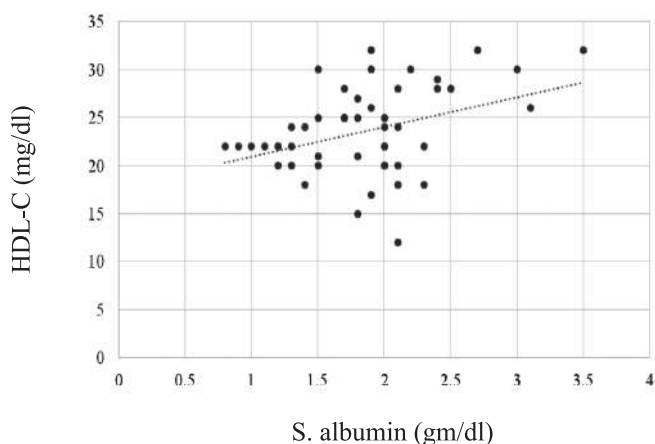


Fig. III: Correlation between S. albumin & HDL-C in adult NS patients

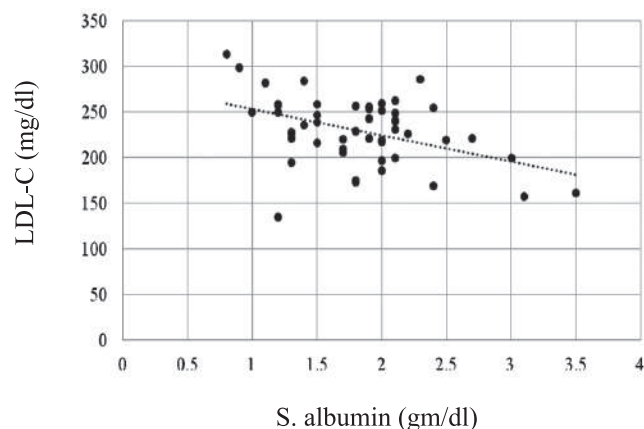


Fig. IV: Correlation between S. albumin & LDL-C in adult NS patients

## Discussion

The present study was designed to observe the correlation between hypoalbuminemia and lipid abnormalities in adult nephrotics. In nephrotic syndrome, hypoproteinemia stimulates protein synthesis in the liver, resulting in the overproduction of lipoproteins. Where on the other hand lipid catabolism is decreased due to lower levels of lipoprotein lipase, the main enzyme involved in lipoprotein breakdown. Both these two pathophysiological phenomenon are involved for dyslipidemia in adult patients with nephrotic syndrome.<sup>6</sup> Present study also reveals increased serum levels of lipid profile in adult patients with nephrotic syndrome.

Hypoalbuminemia leads to a lack of carrier for the transport of fatty acids and this is compensated by an increase in fractions linked to lipoproteins. Lipid levels generally correlate inversely with the serum albumin concentration and plasma oncotic pressure.<sup>14</sup> Moreover, hypoalbuminemia reduced oncotic pressure, and loss of regulatory protein loss in the urine of nephrotic patients all have been suggested as driving stimulus for synthesis of proteins and of LDL and VLDL cholesterol by the liver. Moreover, hepatic tissue expression and activity of diacylglycerol acyltransferase, an

enzyme that catalyzes the final step in TAG biosynthesis, is increased.<sup>15</sup>

Present study shows the significant positive correlation with serum albumin level with serum Tchol, TAG and LDL-C level and significant negative correlation with serum LDL-C level in adult nephrotic syndrome patients which is similar with the findings of the study conducted by Andrew et al.<sup>16</sup> and Prerna et al.<sup>17</sup> Where Krishnaswamy et al.<sup>18</sup> observed a direct relation between serum albumin and HDL-C, when serum albumin was too low, the HDL-C was also low. But the correlation was not statistically significant ( $P > 0.05$ ).

## Conclusion

Due to the significant pattern of decrease in serum albumin level shows increase in LDL-C, Tchol, TAG and decrease in HDL-C values, patients with nephrotic syndrome are at higher risk of cardiovascular and cerebrovascular complications. So, regular screening of lipid profile should be performed for early diagnosis for dyslipidemia to prevent further complications in adult nephrotic syndrome patients.

## References

1. Adu, EM. 'Serum lipid profile abnormalities among patients with nephrotic syndrome'. *Int. J Med Biomed Res.* 2013; 2: 13-17.
2. Hull RP and Goldsmith DJ. 'Nephrotic syndrome in adults'. *BMJ.* 2008; 336: 1185-1189.
3. Borrego R, Jaime, Montero C and Orlando (eds.) 'Nefrolgia: Fundamentos de Medicina'. Spain: Corporacion para investigaciones biologicas, 2003; pp.340-41.
4. Shrivastava RN and Bagga A. 'Nephrotic syndrome: Paediatric Nephrology'. 4th edn., New Delhi: Jaypee Brothers. 2005 ;45: 161-200.

5. Rahman H, Hossain A, Hossain SZ, Haque AK, Hossain MM. and Islam MN. 'Clinical profile and therapeutic outcome of nephrotic syndrome'. Journal of Teacher's Association. 1996;7: 13-15.
6. Chan CM. 'Hyperlipidaemia in chronic kidney disease with nephrotic syndrome'. Ann Acad Med Singapore. 2005; 35: 31-35.
7. Thomas ME, Rosenblum AH and Fisher R. 'Relationship between blood lipid and blood protein levels in nephrotic syndrome'. Am J Dis. 1999; 81: 207-211.
8. Moulin P, Gerald B, Appel G and Henry N. 'Increased concentration of plasma cholesteryl ester transfer protein in nephrotic syndrome: role in dyslipidemia'. Kidney Int. 1992; 33: 1817-1822.
9. Vaziri ND. 'Dyslipidemia of chronic renal failure: the nature, mechanism and potential consequences'. Am J physiol Renal physiol. 2006; 290: 262-272.
10. Marsh JB. 'Lipoprotein metabolism in experimental nephrosis'. Proc Soc Exp Biol Med. 1996; 213: 178-186.
11. Rashid HU 'Nephrotic syndrome-Evidence based management'. Bangladesh Renal J. 2003; 22: 1-4.
12. Friedwald WT, Levy RI and Frederickson DS. 'Estimation of the concentration of low-density lipoprotein cholesterol in plasma, without use of preparation ultracentrifuge'. Clin Chem. 1972; 18: 499-502.
13. Clinlab navigator. Lipid Profile 2012 [Online] [Accessed on 7th May 2012] <http://www.clinlabnavigator.com/lipid-panel.html>.
14. Majumder A and Wheeler DC. 'Lipid abnormalities in renal disease'. J R Soc Med. 2000; 93: 178- 182.
15. Appel G. 'Lipid abnormalities in renal disease'. Kidney int. 1991; 39: 169-183.
16. Andrew TF, Melvin RM, Edna VA, Froilan AL, Libertad LR et al. 'Dyslipidemias in Nephrotic syndrome.' Phil. J. Internal Medicine. 1997; 35: 99-102.
17. Prerna, ND, Kamble, Meahendra T and Suryabhan, L. 'Analysis of lipid profile and 24 hour urinary protein excretion as a predictor of cardiovascular risk in CKD with nephrotic syndrome'. J Pharm Biomed Sci. 2012; 21(2): 63-71.
18. Krishnaswamy D, Indumati V and Satishkumar D 'Serum proteins, initial and follow-up lipid profile in children with nephrotic syndrome'. IJABPT. 2011; 2(3): 59-64.