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Research Article

COMPARISON OF PLASMA PROTEINS IN TYPE 2 DIABETES MELLITUS AND NON-DIABETICS

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ABSTRACT

Introduction: Insulin resistance in type 2 diabetes mellitus is known to alter fractional synthetic rates of different plasma proteins. Objective of the study was to compare plasma total proteins and albumin in type 2 diabetics with that of non-diabetic controls.

Methodology: This retrospective study was conducted in Adarsha Superspeciality Hospital, Udupi, Karnataka. Data of plasma proteins and demographic profiles of 173 type 2 diabetes mellitus patients was compared with that of 121 healthy non-diabetics. Mann Whitney U test was used to compare the data.

Results: A significantly low albumin (p= 0.0080) , significantly high globulin levels (p = 0.0246) were observed in type 2 DM. However differences in total protein levels were insignificant. Albumin/globulin ratio was found to be low very significantly (p=0.0006) in patients.

Conclusion: We conclude that hypoalbuminemia and hyper gamma globulinemia were observed in patients of type 2 DM as compared to non-diabetics.

KEYWORDS: Total Protein, Albumin, Globulin, Type 2 DM

INTRODUCTION

Type 2 diabetes mellitus is a known state of insulin resistance affecting metabolism of carbohydrates, lipids as well as proteins. It has been reported that during insulin deficiency, fractional synthetic rate of albumin is decreased significantly and concomitantly fibrinogen synthesis is increased. Lowered albumin levels are widely reported by Rehman et al (1). Study by Mohammed et al reported an elevated total proteins in diabetics (2). However only limited number of studies are available on plasma total proteins, albumin and globulins in type 2 diabetes in our settings. Hence the present retrospective study was conducted to assess the levels of plasma total proteins and albumin levels in type 2 diabetes cases. Primary objective of the study was to compare plasma total proteins and albumin in type 2 diabetics with that of non-diabetic controls.

METHODOLOGY

The retrospective, case control study was conducted in Adarsha Superspeciality Hospital, Udupi, Karnataka. The approval of institutional ethics committee was obtained prior to the study. Data of plasma proteins and demographic profiles of 173 type 2 diabetes mellitus patients had attended the teaching hospital due to various illnesses was collected from clinical biochemistry laboratory in the year 2018. Data of 121 normal healthy controls was also collected. 32% of diabetics were females and 68% of them were males whereas control group had 46% females and 54% males. Mean age of patients was 52.84 ± 2.04 years

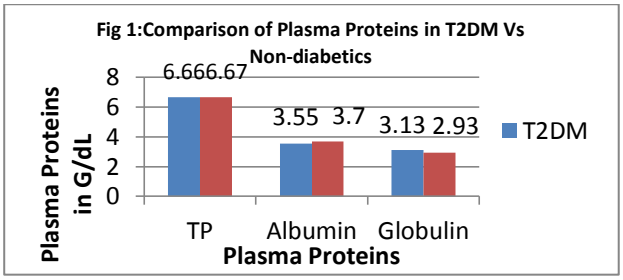
and that of controls was 49.21±2.47 years, expressed as mean ± SEM.

We excluded cases of liver disorders, congestive heart diseases, malnutrition, acute and chronic inflammatory conditions, fever and hyperthyroidism. Data was obtained from the clinical biochemistry laboratory attached to the Adarsha hospital. Total protein, albumin, and blood sugar were estimated using automated chemistry analyzer, Transasia EM-200 .Diabetes mellitus was diagnosed based the criteria of American diabetes association(ADA)(3).

Statistical analysis was carried out with graph pad Instate software. Mann Whitey U test was used to compare the data

RESULTS

A significantly low albumin (p= 0.0080) significantly high globulin levels (p = 0.0246) were observed in type 2 DM. However differences in total protein levels were insignificant. Albumin/globulin ratio was found to be low very significantly (p=0.0006) in patients in comparison to the control group. The values are depicted in Fig 1.Mean FBS was 182.28±8,



DISCUSSION

We observed hypoalbuminemia and hypergamma globulinemia in diabetics compared to controls. Extent of elevation of globulin was 6.8% in diabetics compared to non-diabetics. 4% decline in albumin was observed in T2DM . Low albumin levels observed in our patients can be attributed to the diabetes associated renal dysfuncion. However we do not have data on urine analysis for protein detection or glomerular function rate which is the limitation of this study.Similar findings are reported in study by Schmidt et al , which suggest lowered albumin levels in diabetics(4). But on the contrary, in a study by Malawadi et al, mean albumin was in the normal reference range and there was no significant difference between albumin levels in patients and control group (5). This finding can be attributed to compensatory increase in albumin synthesis in diabetics with albuminuria. Tessari and colleagues suggest that albumin and fibrinogen synthesis are increased in type 2 diabetics with albuminuria as compared to those without albuminuria, due to up-regulation of hepatic secretory proteins (6). Comparatively high total proteins were reported in few studies on contrary to our findings (1,5,6). This elevation could be attributed to the elevation of various acute phase proteins, fibrinogen and globulins in DM which contribute to the elevation in plasma proteins. In diabetics, reports are available which suggest an elevation in acute phase proteins CRP,α1-acid glycoprotein , plasminogen ,complement C3, ceruloplasmin etc. (8-11). Fibrinogen levels are reported to be increased in type 2 DM due to increased synthesis(2,12). Study by Ardavi and colleagues suggests that diabetics might exhibit hypergamma globulinemia (13).This fact justifies hyperglobulinemia found in our study.

CONCLUSION

We conclude that hypoalbuminemia and hyper gamma globulinemia were observed in patients of type 2 DM in our study as compared to non-diabetics. Non-availability of data on fibrinogen levels and urine albumin reports are the limitations of our study.

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