



Original Research Article

Evaluation of Serum Uric Acid Levels in Patients of Type- 2 Diabetes Mellitus, Attending in Tertiary Care Hospital at, NMCH, Patna

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Abstract

Objective: The present study was to evaluate the serum uric acid levels in patients of Type- 2 Diabetes Mellitus and its comparison with normal healthy adult individuals and to correlate serum uric acid levels with different glycaemic levels in patients of Type- 2 Diabetes Mellitus.

Materials and Methods: A total of 42 patients with the different age, sex, dietary habits, drinking habits, predominant physical activities, BMI, socio-economic status having fasting blood glucose level >126 mg/dl and diagnosed patient of DM either on hypoglycaemic drugs or insulin were also included in the study group. A total of 42 non- diabetics individuals were selected from attendants of patients, hospital staffs, by matching the age and other aspects to the study group as control group. Estimation of Fasting blood glucose level, HbA1c level, Serum Uric acid level were done by Hexokinase methods, D-10 micro column methods, and by uricase method respectively.

Results: The mean serum uric acid level in Group A, Group B and Group C were 5.85 mg/dl with a range of 4.3-8.6 mg/dl, 6.26 mg/dl with a range of 1.7-7.5 mg/dl and 6.32 mg/dl with a range of 3.5-8.9 mg/dl respectively. Serum uric acid level of subjects of type-2 DM with HbA1c <7 when compared to control subjects with HbA1c <7 showed higher values. The mean serum uric acid level was 5.26mg/dl range of 4.3-6.8 mg/dl in subjects of type- 2DM groups and 3.93 mg/dl with a range of 2.2-6.7 mg /dl in control groups.

Conclusion: Uric acid is a last by product of purine metabolism and its increased levels have been associated with insulin resistance and in Type-2 Diabetes Mellitus. The relation between Type-2 DM and increased serum uric acid level has been observed. Randomized controlled trial is needed to see whether lowering serum uric acid level decreases the glycaemic level of the DM patients or not.

Keywords: Glycated Hemoglobin, Fasting Blood Sugar, Diabetes Mellitus, Uric acid.

Introduction

The prevalence of diabetes mellitus for all age groups worldwide was estimated to be rise 8% in

2000 and could increase to 44% in 2030. The total number of people with diabetes is projected to increase from 171 million in 7000 to 366 million

in 2030. In India number of people with diabetes is 31.7 million which may increase to 70.4 million by 2030. Uric acid is the last by product of purine metabolism. Uric acid can act as a pro-oxidant, particularly at increased concentration and may thus be a marker of oxidative metabolism. Increased levels of uric acid have been associated with insulin resistance and with established Type-2 Diabetes Mellitus. Dehghan et al and Chien et al have demonstrated that uric acid is an independent predictor of Type- 2 Diabetes Mellitus. Uric acid cannot be viewed as a secondary phenomenon. Uric acid and its changes during follow up were related to corresponding changes in fasting and post load glucose and insulin levels.

The present study is designed to evaluate serum uric acid levels in patients of type- 2 Diabetes Mellitus and its comparison with normal healthy adult individuals and to correlate serum uric acid levels with different glycemic levels in patients of type -2 Diabetes Mellitus.

Materials and Method

Present study was conducted in the Department of Biochemistry, Nalanda Medical College, Patna, with the help of Department of Medicine, during the period of July 2016 to November 2018. A total of 42 patients with the different age, sex, dietary habits, drinking habits, predominant physical activities, , BMI, socio-economic status having fasting blood glucose level > 126 mg/dl and diagnosed patient of DM either on hypoglycemic drugs or insulin were also included in the study. Patients of type- 2 DM were further divided into three groups. Group A comprised of 10 Patients with HbA1c <7 , Group B comprised of 12 cases with HbAlc 7-8, Group C comprised of 22 cases with HbA1 c >8 . Individuals having Type-1diabetes mellitus, cardiovascular disease, renal disease, dyslipidemia, and who had history of stroke, on lipid lowering drugs , suffering from gout or on the drugs that can alter serum uric acid level were excluded from the study.

42 non- diabetics individuals were selected from attendants of patients, hospital staffs, by matching

the age and other aspects to the study group as control group. Estimation of Fasting blood glucose level, HbA1c level, Serum Uric acid level were done by Hexokinase methods, D-10 micro column methods, and by uricase method respectively. Written informed consent was taken from all the patients.

Results

The mean serum uric acid level in Group A, Group B and Group C were 5.85 mg/dl with a range of 4.3-8.6 mg/dl, 6.26 mg/dl with a range of 1.7-7.5 mg/dl and 6.32 mg/ dl with a range of 3.5-8.9 mg/dl respectively. These values when compared statistically were found to be insignificant. The comparative study of serum uric acid level and its statistics in subjects of Type-2DM with HbA1c <7 and control groups with HbA1c <7 . Serum uric acid level of subjects of Type2 DM with HbA1c <7 when compared to control subjects with HbA1 c <7 showed higher values. The mean serum uric acid level was 5.26mg/dl range of 4.3-6.8 mg/dl in subjects of Type- 2 DM groups and 3.93 mg/dl with a range of 2.2-6.7 mg /dl in control groups. This value when compared statistically found to be significant. Hence it shows definite relation between type-2 DM and increased serum uric acid level.

Statistical analysis and comparison of mean serum uric acid level in subjects of Type-2 DM group were compared with that of control group and was found to be statistically significant.

Discussion

Here the serum uric acid level was compared between the normal person and the diabetic person having HbAl c level less than 7 with the different HbAl c level of DM patients. Present study was to evaluate the serum uric acid level in subjects of type2 DM and comparison of the different groups to see how serum uric acid level varies with different glycemic levels in subjects of Type-2 DM. To achieve this serum uric acid level estimation was done in subjects of Type-2 DM

and also in the normal healthy individuals who served as control. In all, 84 cases were observed out of which 42 were normal healthy control group, 42 were of Type- 2 DM subjects, the mean serum uric acid level in subjects of type- 2 DM at different glycemc level and statistical analysis was done to find out if different glycemc level has got any hearing on serum uric acid level.

Patients of Type 2DM were further divided into three groups. Group A comprised of 10 Patients with HbA1c <7, Group B comprised of 12 cases with HbA1c 7-8, Group C comprised of 22 cases with HbA1 c >8. The mean serum uric acid level in Group A, Group B and Group C were 5.85 mg/dl with a range of 4.3-8.6 mg/dl, 6.26 mg/dl with a range of 1.7-7.5 mg/dl and 6.32 mg/ dl with a range of 3.5-8.9 mg/dl respectively. These values when compared statistically were found to be insignificant .Thus the different glycemc level has effect on mean serum uric acid level and it may be attributed to the lifestyle, which is rich in group C with (HbA1c >8) as compared to group A and group B.

The comparative study of serum uric acid level and its statistics in subjects of Type-2 DM with HbA1c <7 and control groups with HbA1c <7. Serum uric acid level of subjects of Type-2 DM with HbA1c <7when compared to control subjects with HbA1 c <7 showed higher values. The mean serum uric acid level was 5.26mg/dl range of 4.3-6.8 mg/dl in subjects of Type- 2 DM groups and 3.93 mg/dl with a range of 2.2-6.7 mg /dl in control groups. This value when compared statistically found to be significant. Hence it shows definite relation between Type-2 DM and increased serum uric acid level.

The difference in mean value between the two groups was 1.32 mg/dl that is a significant value. The studies from Kodama S pport of this Asumi M Su, Saito K, Yacht Y, Gawara A et al. (2009), Chien KL, Chen MF, Hsu HC, Chan et al. (2008), Su TC, Dehghan A, van Hoek M, Sijbrands EJ, Holman A, Witteman jc (2008). They also observed the similar trends.

Conclusion

Hence it can he concluded that Type-2 DM is related to rise in serum uric acid level .The rise in serum uric acid level is directly related to rise in HbA1 c level. The rise in serum uric acid level may be asymptomatic or may latter develops into frank gout. Randomized controlled trial will be needed to see whether lowering scrum uric acid level decreases the glycemc level the DM patients, lower the ischemic cardiac events and other effects over target organs The clinical implications of lowering serum uric acid level, if successful, would have profound effect on improving the health this group of hyperuricemic subjects of Type 2 DM. More study is needed to hold it true.

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