ORIGINAL RESEARCH ARTICLE

The Relation between serum uric acid & HbA1c in geriatric patients of Type 2 Diabetes in Amravati, Maharashtra, India.

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Abstract: Type 2 Diabetes mellitus (DM) is a heterogeneous disease which is characterized by variable degrees of insulin resistance or/and impaired insulin secretion as well as its deficiency (absolute/relative). The study was carried out to determine the relationship between serum concentration of uric acid and HbA1c among the geriatric group with type 2 diabetes mellitus in diabetic camps carried out at Amravati. We performed a cross sectional study on 30 patients of both genders of geriatric group, and a control group of 30 age and sex matched normal healthy individuals. Serum uric acid was tested by Uricase/PAP method [7, 15] and HbA1c by NycoCard READER II (color reflectometry) [6]. We observed the positive correlation between uric acid and HbA1c, as 0.080 which was found to be significant as 2.50 between the uric acid and HbA1c in geriatric patients of type 2 Diabetes. In healthy controls, we observed the positive correlation between uric acid and HbA1c as 0.074 which was not significant.

Key words: Uric acid; HbA1c; Type2 diabetes; Diabetes mellitus.

Introduction

Diabetes has become a widespread epidemic, due to increasing prevalence and incidence of type2 diabetes [11]. It is a significant cause of premature mortality and morbidity related to cardiovascular disease, blindness, kidney and nerve disease [16]. Diabetes is a clinical condition brought about by body's inability to produce enough insulin or to use the available insulin. In deficiency, there is an increase in the concentration of glucose in the blood as well as other metabolic products [19]. Uric acid is a chemical produced when the body breaks down substances called purines [17]. Serum uric acid is positively associated with serum glucose in healthy subjects. However, this association is not consistent between healthy and diabetic individuals, as a low serum levels of uric acid are reported in the hyperglycemic state [4].

HbA1c refers to glycated hemoglobin. It develops when hemoglobin, a protein within red blood cells that carries oxygen throughout body, joins with glucose in the blood, becoming' glycated' [5]. Landmark and historical research trials have shown a positive association between impaired glycemic control and risk of coronary heart disease and other diabetes complications such as nephropathy [2, 12, 13]. Higher levels of HbA1c were associated with increased risk for development of microangiopathy in diabetics. This may be due to the fact that HbA1c has special affinity for oxygen thereby causing tissue anoxia and play important role in causation of micro and macroangiopathy [18]. The type II diabetes is rising in the U.S. and all over the world, thereby

Becoming an increasingly powerful threat to global health [14].

Material and Methods

We selected 30 known geriatric diabetic type2 patients from the diabetes camps and carried out the study on these patients and in a group of 30 age and sex matched normal healthy individuals which were randomly selected as a control group. The study was conducted using a single center in serial camps organized by Diabetic Association of India, Amravati Branch. Serum uric acid was estimated by Uricase/PAP method [7, 15] and HbA1c was estimated by using a NycoCard READER II [6]. The data was statistically analyzed, the coefficient correlation was studied by Pearson's correlation coefficient to study relationship between uric acid and HbA1c level in both experimental and control group and significance of coefficient of correlation is calculated. (The Pearson's Known type 2 DM Patients in geriatric (>55 Year of age) group attending the camps were selected for the study).

Results

The values obtained for uric acid and HbA1c for experimental group are shown in the table 1 and for control group in table 2, the graphs being accordingly plotted. The statistical analysis showed positive correlation between uric acid and HbA1c in geriatric patients. The degree of correlation is positive i.e., 0.080. Significance of coefficient of correlation was found to be 2.50 for 0.05 % level. The coefficient of correlation between uric acid

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and HbA1c was found to be significant in the study population.

Table 1: The values of uric acid and HbA1c of geriatric patients with type 2 diabetes.

| Sr. No. of patient	Uric acid (mg/dl)	HbA1c (%)
1	7.6	8.4
2	7.7	7.8
3	5.0	7.8
4	7.3	7.2
5	3.7	6.4
6	5.6	7.1
7	6.3	8.9
8	5.5	7.8
9	9.1	6.8
10	9.9	8.0
11	7.2	8.2
12	5.7	8.4
13	10.0	6.7
14	4.3	8.8
15	6.0	9.8
16	5.0	9.1
17	5.7	10.0
18	3.8	9.0
19	8.5	8.4
20	7.2	13.4
21	3.9	7.3
22	5.3	8.9
23	5.5	7.9
24	5.9	7.3
25	5.7	7.3
26	6.3	7.0
27	4.0	8.4
28	7.0	7.1
29	6.5	6.3
30	7.0	7.5
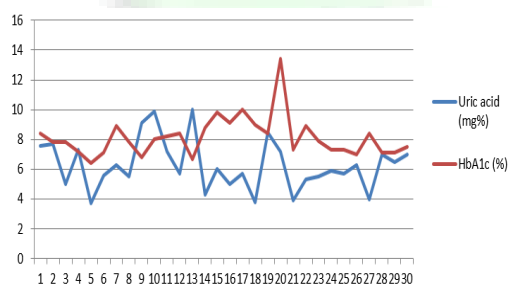
Graph: Graphic representation of uric acid & HbA1c values of type 2 diabetic patients.

Table 2: The Values of Uric acid and HbA1c in Control Group.

Sr. No. of controls	Uric acid (mg /dl)	HbA1c (%)
1	3.7	3.9
2	4.9	4.4
3	2.8	4.3
4	3.3	3.7
5	3.4	4.0
6	2.9	4.1
7	4.1	4.4
8	5.7	4.3
9	4.8	4.2
10	6.3	4.0
11	3.5	3.7
12	2.9	3.8
13	5.4	4.3
14	3.7	4.0
15	6.1	4.1
16	5.9	4.4
17	5.2	3.9
18	7.0	3.7
19	6.4	4.0
20	5.9	4.1
21	5.8	3.5
22	3.9	4.1
23	4.2	4.0
24	4.7	4.4
25	5.3	4.5
26	6.4	3.3
27	4.5	3.7
28	3.7	3.9
29	5.3	4.1
30	6.1	4.4
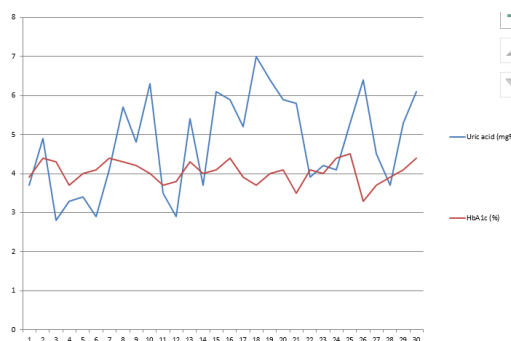
Graph: Graphic representation uric acid & HbA1c values in Control Group.

The correlation coefficient for the relationship between uric acid and HbA1c level in control group showed positive correlation i.e., 0.074 (table 2). The Result was statistically not significant in the control group. Calculated t value is 1.28, therefore statistically no significant correlation exists between uric acid and HbA1c in control group.

Discussion

Present study showed the similar results as in the studies by other investigators and focuses on relation between biochemical parameters and Diabetes. In this study involving 30 geriatric type2 diabetes mellitus subjects, we found significant positive correlation between uric acid and HbA1c.

Diabetes mellitus is a common disease in elderly people, with almost 50% of Type 2 diabetic patients being over 60 years of age. [9]. Serum uric acid level was associated with HbA1c, fasting and post prandial blood glucose suggesting a significant role of serum uric acid in the deterioration of glucose toleration [8]. Serum uric acid is a strong and independent risk factor for diabetes. [3].

Serum uric acid levels increased with moderately increasing levels of glycosylated hemoglobin [1]. Higher levels of uric acid are associated with lower HbA1c both in type-1 and type-2 diabetic patients. Uric acid is involved in the augmentation of insulin secretion in type2 subject [10].

Conclusion

In the present study we have found a positive relationship and significant correlation between uric acid and HbA1c in geriatric type 2 diabetic

patients. However, in the control group, positive relationship but no significant correlation exists between uric acid and HbA1c. Thus, the present study has opened new avenues for further studies in this sea of knowledge about diabetes, particularly its relations to various test results to expedite effective management of this common killer.

Acknowledgments

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