



TO EVALUATE SERUM URIC ACID LEVELS IN PATIENTS WITH PRE-DIABETICS AND NEWLY DIAGNOSED TYPE II DIABETES MELLITUS AND ITS ASSOCIATION WITH CARDIOVASCULAR RISK FACTORS

Sagar. P. Kabadi., Mrudul.R.Nair and Vijay. M

Rajarajeswari Medical College & Hospital, Kambipura, Bangalore-74, Affiliated to Rajiv Gandhi University of health Sciences, Bangalore

ARTICLE INFO

Article History:

Received 9th March, 2018

Received in revised form 16th

April, 2018 Accepted 26th May, 2018

Published online 28th June, 2018

Key words:

DM – Diabetes Mellitus, CVD – Cardiovascular Disease, BMI – Body Mass Index, SUA – Serum Uric Acid, HTN – Hypertension, TGL – Triglycerides, LDL- Low density lipoprotein, TC – Total Cholesterol. Comparative, Three group.

ABSTRACT

Introduction: India has the highest number of diabetics with estimated prevalence of 72 million, expected to reach 123.5 million by 2040. DM increases the risk of developing cardiovascular diseases; increase in sudden cardiac death is on the rise in urban regions, which can largely be attributed to increase in prevalence of Coronary Artery Disease, DM and HTN. Serum Uric Acid has been an independent risk factor. Understanding the association between hyperuricemia and CVD, especially in patients with Type 2 DM and Pre-diabetics in absence of other confounding factors is a worthy consideration.

Materials: Study is a comparative 3 group controlled clinical study conducted at RRMCH over a span of 1 year comprising 150 patients including 50 diabetics, 50 pre-diabetics and 50 control subjects. The study consisted of demographic profiles, cardiovascular risk factors and investigations like FBS, PPBS, HbA1c, RFT, Lipid Profile, Serum uric Acid, Anthropometric measurements.

Observations: Mean Serum Uric Acid value among diabetics was 5.06+/-0.83, 4.67+/-0.79 among pre-diabetics and 3.96+/-0.96 among control subjects. Mean age distribution 52.50+/-0.97, 45.70+/-9.81 among pre-diabetics and 48.59+/-10.74 among control subjects.

Conclusions: Serum Uric acid was found highest among diabetics compared to pre-diabetics and lowest among control subjects. Among diabetics, BMI, Total cholesterol, LDL, Urea, S. creatinine, FBS, PPBS, HbA1c were statistically significant in patients with high SUA. Among pre-diabetics, BMI, TGL, S.Creatinine were significant in patients with high SUA. Among control subjects, BMI, TC, LDL, S.Creatinine had the highest correlation when compared with high SUA. Through our study we can emphasize that SUA is an independent risk factor for cardiovascular disease, and must be routinely assessed.

Copyright©2018 Sagar. P. Kabadi., Mrudul.R.Nair and Vijay. M. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Diabetes Mellitus (DM) refers to a group of common metabolic disorders that share a phenotype of hyperglycemia. Currently, the prevalence of Diabetes worldwide is estimated to be around 415 million (8.8% of world population) and is predicted to reach 642 million by 2040. India has the second highest number of diabetics with estimated prevalence of 72 million, which is expected to reach 123.5 million by 2040.⁽¹⁾ DM increases the risk of developing cardiovascular diseases. Incidence of sudden cardiac death is on the rise, especially in urban regions of India, which may largely be attributed to the increase in prevalence of coronary artery disease, Diabetes, hypertension.⁽²⁾ Indeed DM is associated with a 2-4 fold increase in risk of developing CAD.

However, such an increased risk cannot be explained by hyperglycemia alone, as other cardiovascular risk factors such as hypertension and dyslipidemia also play a major role.⁽³⁾⁽⁴⁾ Moreover, it is observed that the prevalence of other cardiovascular risk factor such as smoking, sedentary lifestyle and obesity are higher among diabetic compared to nondiabetic patients.⁽⁵⁾

The role of some risk factor such as serum uric acid levels in developing CVD is still controversial. Framingham study has suggested that hyperuricemia is only bystander in CVD and its association with the disease is indirectly influenced by confounding factors such as obesity, dyslipidemia, hypertension, use of diuretics and insulin resistance.⁽⁶⁾

On the contrary, several other studies have identified serum uric acid levels as an independent predictor of CVD in various population groups.⁽⁷⁾

Many researches showed that overt diabetes was associated with low Uric acid levels, particularly in diabetic men.⁽⁸⁻¹⁵⁾ A prospective study⁽¹⁴⁾ among 10,000 men reported that serum

*Corresponding author: Sagar. P. Kabadi

Rajarajeswari Medical College & Hospital, Kambipura, Bangalore-74, Affiliated to Rajiv Gandhi University of health Sciences, Bangalore

uric acid levels were higher in pre-diabetics than in non-diabetics, but decreased in stage of diabetes. Such contrasting reports make it difficult to delineate the specific role of hyperuricemia in CVD, thus limiting its clinical application.

Nevertheless, understanding the association between hyperuricemia and CVD, especially in patients with DM and pre-diabetics in absence of other cofounding factors may not be a worthy consideration. Hence, we evaluated the risk factors of CVD including serum uric acid levels among subjects with Type II Diabetes Mellitus.

MATERIAL AND METHODS

Study place: Rajarajeswari Medical College & Hospital, Bengaluru.

Duration of study: 1 year

Study design: A comparative three group controlled clinical study.

Data collection: 50 cases each under pre-diabetics, Newly Diagnosed Type II DM and control subjects presenting to RRMCH , were asked for their participation in the study and informed/written consent was taken for the same (N=150)

Controls: 50 subjects having normal blood sugars and not falling under the exclusion criteria.

Inclusion Criteria

1. Patients with newly detected Type II Diabetes Mellitus (According To ADA guidelines)
2. Patients with Pre-Diabetes (Impaired Fasting/Post Prandial plasma Glucose according to ADA criteria)
3. Patients above 30years of age
4. Both sexes were included.

Exclusion criteria

1. Type I Diabetes Mellitus
2. Patients with Renal Failure.
3. Patients on long-term diuretics and steroid therapy
4. Patients suffering from gout
5. Patients who are regularly consuming alcohol.
6. Patients who are on anti-metabolite and chemotherapy drugs.
7. Patients with history of PVD/CVA/PTB.
8. Pregnant and lactating mothers.
9. Patients suffering from psoriasis and high cell turn over diseases.
10. Patients suffering from fever.

Statistical methods

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean ± SD (Min-Max) and results on categorical measurements are presented in %. Significance is assessed at 5% level of significance. The following assumptions are made:

1. Dependent variables should be normally distributed.
2. Samples drawn from the population should be random; cases of samples should be independent.

Analysis of Variance (ANOVA) has been used to find the significance of study parameters between three or more groups of patients.

Chi-square test has been used to find the significance of study parameters on categorical scale between two or more groups, Non-parametric setting for qualitative data analysis.

Significant figures:

+ Suggestive significance (P value: 0.05<P<0.10)

Moderately significant (P value: 0.01<P<0.05)

Strongly significant (P value: P<0.01)

Statistical software namely SPSS 15.0, MedCalc 9.0.1 were used for analysis of data and Microsoft word and Excel have been used to generate graphs, tables etc.

RESULTS

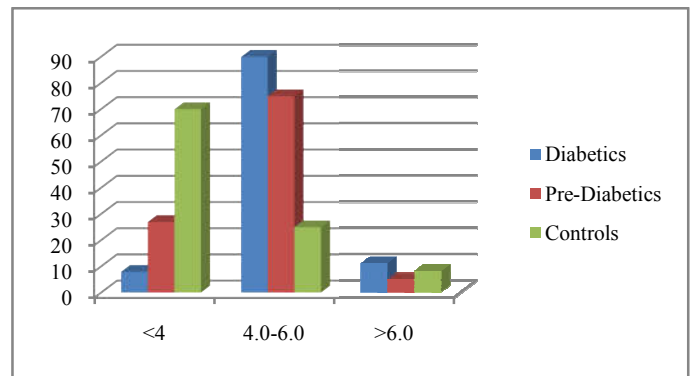
Serum Uric acid in three different groups studied.

Serum Uric acid	Diabetes	Pre-Diabetics	Controls	Total
<4	3 (6%)	12 (24%)	35(70%)	50(33.3%)
4-6	42(84%)	36(72%)	11(22%)	89(59.3%)
>6	5(10%)	2(4%)	4(8%)	11(7.3%)
Total	50(100%)	50(100%)	50(100%)	150(100%)
Mean ±SD	5.06±0.83	4.67±0.79	3.96±0.96	4.56±0.97

P<0.001, ANOVA test

Mean serum uric acid values were 5.06±0.83 among diabetics, 4.67±0.79 among pre-diabetics and 3.96±0.96 among control subjects which was statistically significant with a p value of <0.001.

Also among Diabetics, BMI, Waist-Hip ratio, Total Cholesterol, LDL, Triglycerides, Urea, Serum Creatinine, FBS, PPBS and HbA1c were found statistically significant in patients with high serum uric Acid levels.



DISCUSSION

Our study

Mean age of distribution among the diabetic was 52.60±0.97, pre-diabetics was 45.70±9.81 and among control subjects was 47.46±11.53.

Mean Serum Uric Acid levels was 5.06±0.83 among diabetics, 4.67±0.79 among pre-diabetics and 3.96±0.96 among control subjects.

Study by SudhindraRao., Bino John Sahayo

Mean age among Diabetics was 55.89, pre-diabetic was 59.79 and control subjects was 54.82.

Mean uric Acid levels value among diabetics was 3.78±1.03, among pre-diabetics was 4.88±0.79 and among control subjects was 3.84±0.88.

Study by Bijan Iraj et al

Mean age among pre-diabetics was 44.4±6.2 and among control was 43.1±5.8.

Mean Uric acid levels among Pre-diabetics was 5.2±1.3 and among control was 4.9±1.4.

Study by Ryuichi Kawamoto et al

The mean Serum uric acid levels among controls, pre-diabetics and Diabetics were 5.9±1.4, 6.1±1.5, 5.6±1.5 respectively.

CONCLUSION

Mean age among the diabetic was 52.60±0.97, pre-diabetics was 45.70±9.81 and among control subjects was 47.46±11.53. Mean Serum Uric Acid levels was 5.06±0.83 among diabetics, 4.67±0.79 among pre-diabetics and 3.96±0.96 among control subjects.

Thus we can conclude that serum uric acid in Diabetics and pre-diabetics is an independent risk factor and should be included as a routine investigation for assessing risk status and thereby help modify treatment strategy.

References

1. Diabetes Atlas. International Diabetes Federation 2018, available from <http://www.idf.org/diabetesatlas>
2. Honnekeri BS, Lokhandwala D, Panicker GK. Sudden cardiac death in india: A growing concern *J Assoc Physicians India* 62:36-40.
3. Stamler J, Vaccaro, Neaton JD, Wentworth D, Diabetes and other risk factors and 12 year old cardiovascular mortality for men screened in multiple risk factor interventional trial *Diabetes Care* 1993;16:434-44
4. Stern MP, Glycemia and cardiovascular risk. *Diabetes care* 1997;20:1501-2
5. Turner RC, Millns H, Neil HA et al, Risk factors for coronary artery disease in non-insulin dependent diabetes mellitus :UK prospective Diabetes study (UKPDS :23) *BMJ* 1998;316:823-8.

6. Culleton BF, Larson MG, Kannel WB, Levy D. Serum Uric acid and risk for cardiovascular disease and death: The Framingham heart study *Ann intern med* 1999;131:7-13.
7. Liese AD, Hense HW, Lowel H, Doring A, Tietze M, Keil U. Association of serum uric acid levels with all-cause and cardiovascular disease mortality and incident myocardial infarction in MONICA Augsburg cohort. World Health Organization Monitoring Trends and Determinants in Cardiovascular Diseases. *Epidemiology* 1999;10:391-7.
8. Oda E, Kawai R, Sukumaran V, et al. Uric acid is positively associated with metabolic syndrome but negatively associated with diabetes in Japanese men. *Intern Med* 2009;48:1785-91.
9. Whitehead TP, Jungner I, Robinson D et al, Serum Urate, serum glucose and Diabetes. *Ann ClinBiochem* 1992;29(Pt 2):159-161.
10. Tuomilehto J, Zimmet P, Wolf E, et al, Plasma Uric acid levels and its association with diabetes mellitus and some biologic parameters in a biracial population of Fiji. *Am J Epidemiol* 1988; 127:321-336.
11. Hairong N, Zengchang P, Shaojie W, et al. Serum uric acid, plasma glucose and diabetes. *DiabVasc Dis Res* 2010; 7:40-46.
12. Nan H, Dong Y, Gao W et al, Diabetes associated with a low serum uric acid level In a general Chinese population. *Diab Res ClinPract* 2007; 76:68-74.
13. Meisinger C, Doring A, Stockl D, et al. uric acid is more strongly associated with impaired glucose regulation in women than in men from the general population: the KORA F4 study. *PLoS ONE* 2012; 7:e37180.
14. Herman JB, Goldbourt U. Uric acid and diabetes: observations in a population study. *Lancet* 1982;2:240-243.
15. Cook DG, Shaper AG, Thelle DS, et al. Serum uric acid, serum glucose and diabetes: relationships in a population study. *Postgrad Med J* 1986; 62:1001-1006.

How to cite this article:

Sagar. P. Kabadi., Mrudul.R.Nair and Vijay. M (2018) 'To Evaluate Serum Uric Acid Levels in patients with Pre-Diabetics and Newly Diagnosed Type II Diabetes Mellitus And Its Association With Cardiovascular Risk Factors', *International Journal of Current Advanced Research*, 07(6), pp. 13528-13530. DOI: <http://dx.doi.org/10.24327/ijcar.2018.13530.2421>
