Original Research Article

Prevalence of hyperuricemia in newly diagnosed type 2 diabetes mellitus patients

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ABSTRACT

Background: The relationship between hyperuricemia and diabetes mellitus is proved to be associated with the risk of cardiovascular diseases, but it is unclear whether hyperuricemia is actually related to diabetes.
Methods: A 50 patients with newly diagnosed diabetes according to ADA guidelines were selected. Uric acid level and HbA1C levels were measured. Results were calculated with the reference range of uric acid >7.0 mg/dl.
Results: The mean serum uric acid level was higher in 72% of the newly diagnosed diabetic patients (36/50).
Conclusions: Hyperuricemia seems to be associated with newly diagnosed diabetics. It can be used as a biomarker of deterioration of glucose metabolism.

Keywords: Diabetes mellitus, Hyperuricemia, Serum, Uric acid

INTRODUCTION

Diabetes mellitus is a heterogeneous group of metabolic disorders characterized by hyperglycemia with disturbances of carbohydrate, fat and protein metabolism caused by either lack of insulin secretion or decreased sensitivity of the tissues to insulin. Vascular complications both micro and macrovascular predominate the features of Indian diabetes due to delayed diagnosis.

Various microvascular complications in diabetes mellitus includes

- Diabetic retinopathy,
- Diabetic nephropathy,
- Diabetic neuropathy.

Presence of microvascular complications at the time of diagnosis of diabetes mellitus are showing increasing trend in India. Early detection of microvascular complications and its treatment at this time by intensive therapy can prevent progression of these complications and hence, morbidity and mortality among patients.

Literature has shown the association of uric acid as a risk factor for transforming prediabetes to diabetes type 2. Serum uric acid is formed by the breakdown of purines.

Most children have serum urate concentrations of 180 to 240 mu mol (3 to 4 mg/dl) levels begin to rise in males during puberty but low in females until menopause.[1] With increasing numbers of people with diabetes or prediabetes, it becomes more and more important to find the risk factors associated with abnormal glucose metabolism.

Previous studies showed that in adults elevated serum uric acid is associated with diabetes.[1,2]

Criteria for newly diagnosed type 2 diabetes mellitus

As per the ADA guidelines patients diagnosed with diabetes mellitus according to following criteria within 3 months of presentment to the OPD/ hospital.[3]

- Symptoms of diabetes plus random blood glucose concentration ≥11.1 mmol/L (200 md/dl)[4] or
- Fasting plasma glucose ≥7.0 mmol/L (126 mg/dl)[4]
- Two-hour plasma glucose ≥11.1 mmol/L (200 mg/dl) during an oral glucose tolerance test[4]
- HbA1c >6.5.[4]

METHODS

This study was conducted over a period of 3 months from 1st March 2018 to 31st May 2018 and the study population included 50 patients, newly diagnosed cases of type 2 diabetes mellitus (within 3 months) with age >18 years from medicine OPD and medicine wards at SRMSIMS, Bareilly, Uttar Pradesh, India.

Inclusion criteria

- Age >18 years,
- Newly diagnosed type 2 diabetes mellitus patients (diagnosed within 3 months),
- Not on any treatment for DM.

Exclusion criteria

- Age <18 years,
- Long standing DM >3 months,
- Gestational DM/steroid induced DM/ conditions requiring long term steroids,
- Chronic diseases like CHF/CKD/COPD/ malignancies,
- Patients with history of alcoholism, thyroid disorder, B12 deficiency, drugs causing hyperuricemia like pyrazinamide.

The patients were subjected to detailed history, clinical examination and investigations like-Hb, TLC, HbA1C, fasting and post prandial blood sugar levels, urea, creatinine, uric acid levels.

RESULTS

In present study, 50 newly diagnosed diabetic patients were taken into consideration. Out of which 29 were Males and 21 were females (Table 1). Out of 29 male patients, 10 had HbA1c Levels in the range of 6.5-8, 4 patients in the range 8.1-9.5, 6 patients in the range of 9.1-11 and 9 patients had HbA1C >11 whereas out 21 female patients, 06 had HbA1c Levels in the range of 6.5-

8,7 patients in the range 8.1-9.5, 2 patients in the range of 9.1-11 and 6 patients had HbA1C>11 (Table 2).

Table 1: Age distribution of patients (n=50).

Age group	No. of patients
18-30	18
31-40	14
41-50	6
51-60	9
61-70	3

Table 2: Distribution according to HBA1C levels.

HbA1C levels	6.5-8	8.1-9.5	9.6-11	>11
Male (n=29)	10	4	6	9
Female (n=21)	6	7	2	6

Total no. of patients with newly diagnosed diabetes with hyperuricemia were 32 out of 50 i.e. 64% at the initial presentation.

Table 3: Distribution of male patients and associated hyperuricemia.

HbA1C levels	6.5-8	8.1-9.5	9.6-11	>11
Male (n=29)	10	4	6	9
Hyperuricemia	7	2	3	6
Percentage	70	50	50	66.6

An 18 patients were males whereas 14 were females (Table 3 and 4).

Table 4: Distribution of female patients and associated hyperuricemia.

HbA1C levels	6.5-8	8.1-9.5	9.6-11	>11
Female (n=21)	6	7	2	6
Hyper uricemia	4	4	0	6
Percentage	66.6	57.1	0	100

DISCUSSION

Majority of the patients were males (n=29) than females (n=21). 18 patients were in the age group of 18-30, 14 patients in the age group of 31-40, 6 patients in the age group of 41-50, 9 patients in the age group of 51-60 and 3 patients above 6 years (Table 1).

Out of the male patients, majority had HbA1C Levels between 6.5-8 and in female group, majority of the patients had HbA1C Level between 8.1-9.5 (Table 3 and 4).

Hyperuricemia that is serum uric acid >7 mg/dl was present in 64% of the patients that is 32 out of 50 patients.[5]

Tirkey AS et al, reported mean serum uric acid in prediabetics (n=12) i.e., 4.88±0.79 was more than controls (n=34) i.e., 3.84±0.88 and was statistically significant.[6]

Hashmi N et al, reported that elevated serum uric acid level in prediabetics is statistically significant with mean serum uric acid of cases was 5.31±0.87.[7] Mean serum uric acid of controls was 3.84±0.63. Mean serum uric acid of cases was more than controls and it was found to be statistically significant (p <0.05, s).[7]

Besides age, race, family history of diabetes, body mass index (BMI), glucose intolerance, and metabolic syndrome, serum uric acid levels have been suggested to be associated with T2DM risk.[8] If elevated serum uric acid levels playa causal role in T2DM, serum uric acid levels might also indirectly affect the prevalence of diabetic complications.

The diabetogenic action of serum uric acid levels was reported in 19509 however, its physiological mechanism is not yet known. Serum uric acid levels affect insulin resistance and show a significant correlation with risk factors for metabolic syndrome (high BMI, blood pressure, fasting plasma glucose and triglyceride levels) and low HDL cholesterol values.[5,9-11]

Moreover, high serum uric acid levels were shown to predict metabolic syndrome in a Japanese cohort. A link between serum uric acid levels and insulin resistance has repeatedly been shown, and uric acid itself reportedly plays an important role in the exacerbation of insulin resistance.[12]

CONCLUSION

Based on present study authors would like to draw conclusion that serum uric acid may be considered as an independent risk factor for the development of diabetes and its complications both microvascular and macrovascular. Patients with deranged glucose control should be screened for hyperuricemia and other complications of diabetes. Hyperuricemia seems to be associated with newly diagnosed diabetics. It can be used as a biomarker of deterioration of glucose metabolism.

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