

Original Research

Serum uric acid in type II diabetes mellitus patients

¹Pradeep Kumar, ²Surendra Kumar Ghintala

¹Senior Medical Officer, Department of General Medicine, Govt. DB District Hospital, Churu, Rajasthan, India;

²Assistant Professor, Department of General Medicine, RUHS College of Medical Sciences, Jaipur, Rajasthan, India

ABSTRACT:

Background: A correlation between serum uric acid (SUA) level and the severity of DR has been reported in patients with type 2 diabetes. The present study evaluated serum uric acid level in patients with diabetes mellitus. **Materials & Methods:** 78 patients with type II diabetes of both genders were included. Assessment of glycated hemoglobin (hbA1C), fasting and random blood sugar level was performed. **Results:** Age group 40-50 years had 16, 50-60 years had 20, 60-70 years had 15 and >70 years had 27 patients. Hyperuricemia was present in 65% and absent in 35%. The difference was significant ($P < 0.05$). **Conclusion:** Type 2 diabetes mellitus patients had high serum uric acid level.

Key words: Diabetes Mellitus, glycated hemoglobin, uric acid

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Corresponding author: Surendra Kumar Ghintala, Assistant Professor, Department of General Medicine, RUHS College of Medical Sciences, Jaipur, Rajasthan, India

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INTRODUCTION

Diabetes Mellitus (DM) is characterized by chronic hyperglycaemia with disturbances of carbohydrate, protein and fat metabolism, resulting from defects in insulin secretion or insulin action or both.¹ Serum uric acid (UA) is positively associated with serum glucose levels in healthy subjects. Recent studies have demonstrated that UA levels are higher in subjects with prediabetes and early type II diabetes than in healthy controls.² Furthermore, an elevated serum UA level was found to increase chances for developing type II diabetes in individuals with impaired glucose tolerance. Hyperuricemia has been also added to the set of metabolic abnormalities associated with insulin resistance and/or hyperinsulinemia in metabolic syndrome. An elevated UA levels, as reported, often precedes the development of obesity, hyperinsulinemia, and diabetes.³

A correlation between serum uric acid (SUA) level and the severity of DR has been reported in patients with type 2 diabetes. UA concentration has also been reported to be associated with DN and subclinical atherosclerosis.⁴ In addition, DR and DN have been shown to be associated with SUA concentration. However, the association between DR and DN, and

SUA level has yet to be investigated in Taiwanese patients with diabetes. An elevated uric acid level is a known major risk factor of diabetic microvascular diseases.⁵ In epidemiological studies, serum uric acid (SUA) has been shown as a risk factor for hypertension, dyslipidemia, cardiovascular and kidney diseases however, the putative association between SUA and diabetes is not clear and the findings are controversial, and there may be sex and ethnic differences in the relationships.⁶ The present study evaluated serum uric acid level in patients with diabetes mellitus.

MATERIALS & METHODS

The present study comprised of 78 patients with type II diabetes of both genders. All subjects were informed regarding the study and written consent was obtained.

Data such as name, age, gender etc. was recorded. A thorough clinical examination was carried out. Assessment of glycated hemoglobin (hbA1C), fasting and random blood sugar level was performed. 10 ml of venous blood was obtained for assessment of uric acid level. Results thus obtained were subjected to

statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Age wise distribution of patients

| Age group (Years) | Number | P value |
|-------------------|--------|---------|
| 40- 50 | 16 | 0.05 |
| 50-60 | 20 | |
| 60-70 | 15 | |
| >70 | 27 | |

Table I, graph I shows that age group 40-50 years had 16, 50-60 years had 20, 60-70 years had 15 and >70 years had 27 patients. The difference was significant (P< 0.05).

Graph I Age wise distribution of patients

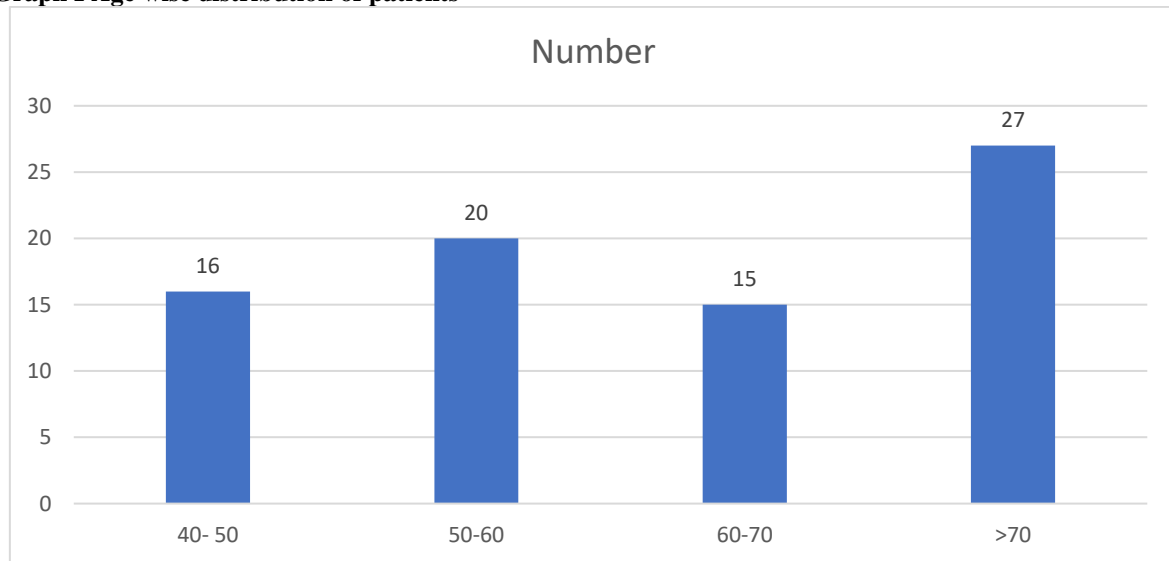
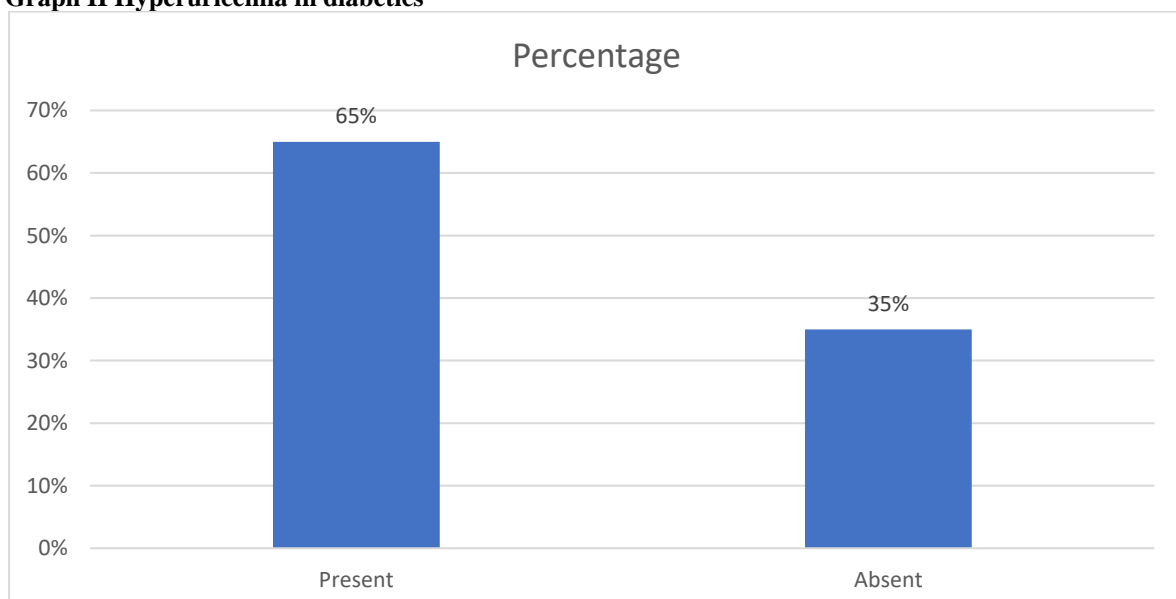


Table II Hyperuricemia in diabetics

| Hyperuricemia | Percentage | P value |
|---------------|------------|---------|
| Present | 65% | 0.01 |
| Absent | 35% | |

Table II, graph II shows that hyperuricemia was present in 65% and absent in 35%. The difference was significant (P< 0.05).

Graph II Hyperuricemia in diabetics



DISCUSSION

Uric acid in serum is the metabolic end product of the purine nucleotides, and its over-production and decreased excretion through kidneys lead to hyperuricemia in humans.⁷ The prevalence of hyperuricemia in the general population is estimated at about 10–25%.⁸ In recent decades, the prevalence of hyperuricemia has increased substantially in the world with a rising trend both in the developed and developing nations.⁹ High concentration of uric acid in the blood can lead to gout and are associated with several medical conditions, including metabolic syndrome, cardiovascular diseases, diabetes and renal dysfunction.¹⁰

The physiopathology of chronic microvascular complications of T1D is complex, involving the interaction between genetic susceptibility, metabolic, and environmental factors.⁴ Many risk factors have already been associated with the development and progression of diabetic nephropathy, such as elevated HbA1c, duration of diabetes, presence of concomitant microvascular complications and elevated albumin excretion rate.¹¹ Diabetes mellitus is undoubtedly one the most challenging health problem in this century. Complications due to diabetes are a major cause of disability and reduce quality of life. The number of patients diagnosed with complications each year is rising.⁸ Diabetic nephropathy is the leading cause of death for people with Type 2 DM.¹² The present study was conducted to assess serum uric acid in diabetes mellitus patients.

In present study, age group 40-50 years had 16, 50-60 years had 20, 60-70 years had 15 and >70 years had 27 patients. Liang et al¹³ found that patients with type 2 diabetes mellitus (DM) may experience chronic microvascular complications such as diabetic retinopathy (DR) and diabetic nephropathy (DN) during their lifetime. In clinical studies, serum uric acid concentration has been found to be associated with DR and DN. They recorded serum uric acid concentration, the severity of DR, and the severity of albuminuria by calculating urinary albumin-to-creatinine ratio (UACR) in 385 patients with type 2 DM. In multivariate logistic regression analysis, a high uric acid concentration was a risk factor for albuminuria and DR. They also demonstrated that there was a higher concentration of serum uric acid in the patients with more severe albuminuria and DR. An increased serum uric acid level was significantly correlated with the severity of albuminuria and DR in Taiwanese patients with type 2 DM.

We found that hyperuricemia was present in 65% and absent in 35%. Haque et al¹⁴ in their study in total, 310 blood samples were collected from 215 male and 95 female subjects and analyzed for FBG, SUA, and lipid levels. All participants were categorized into four quartiles based on SUA concentrations. Diabetes and prediabetes were defined as FBG level ≥ 126 mg/dL and 100–125 mg/dL, respectively. The association between SUA and diabetes was evaluated

by multinomial logistic regression analysis. The prediabetic and diabetic individuals had a lower mean level of SUA (338.2 ± 101.6 and 290.9 ± 98.2 $\mu\text{mol/L}$, respectively) compared to healthy (369.5 ± 110.9 $\mu\text{mol/L}$) individuals ($p < 0.001$). SUA was positively associated with BMI, TG and TC but negatively associated with FBG. The prevalence of diabetes was decreased with increasing concentration of SUA across the quartiles. In regression analysis, SUA levels were inversely associated with diabetes mellitus. SUA levels were high in healthy individuals but declined in prediabetic and diabetic individuals with increasing FBG concentrations. A significant inverse association was observed between the levels of SUA and diabetes in Bangladeshi adults. Further studies are needed to examine the reliability of using SUA to predict diabetes.

Causevic et al¹⁵ in their study showed fold higher USRUA values in diabetic patients as compared to control subjects. Furthermore, there was a trend of correlation of USRUA value with the blood glucose levels in diabetic patients, which was more prominent in diabetic men than in women. With aging, levels of uric acid increased in serum of diabetic patients, and this effect was also more profound in male than in female diabetics. In conclusion, this study showed significantly elevated USRUA levels in patients with Type II diabetes, a negative USRUA correlation with the blood glucose levels in diabetic patients, and an effect of sex and age on the uric acid levels. Since literature data suggest a strong genetic effect on UA levels, it would be pertinent to perform further, possibly genetic studies, in order to clarify gender and ethnic differences in UA concentrations.

CONCLUSION

Authors found that type 2 diabetes mellitus patients had high serum uric acid level.

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