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Assessment of serum uric acid in type II diabetes mellitus patients

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Abstract

Background: 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. The present study was conducted to assess serum uric acid as a risk factor for diabetes mellitus.

Materials & Methods: 90 patients with type II diabetes mellitus of both genders were tested for fasting and random blood sugar level. 10 ml of venous blood was obtained for assessment of uric acid level.

Results: Age group 40-50 years had 40, 50-70 years had 32 and >70 years had 18 patients. The difference was significant ($P < 0.05$). Hyperuricemia was present in 62 and absent in 28. The difference was significant ($P < 0.05$).

Conclusion: Most of the patients of type 2 diabetes mellitus had high serum uric acid level.

Keywords: Diabetes mellitus, uric acid, vascular

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]. Diabetes mellitus is a leading public health problem with increasing incidence and long-term complications such as diabetic nephropathy, diabetic neuropathy, diabetic retinopathy etc.^[2] These complications are mainly a consequence of macro vascular and micro vascular damages of the target organs^[3].

The pathophysiology 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^[5].

A correlation between serum uric acid (SUA) level and the severity of DR has been reported in patients with type 2 diabetes. SUA concentration has also been reported to be associated with DN and subclinical atherosclerosis^[6]. 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^[7]. The present study was conducted to assess serum uric acid as a risk factor for diabetes mellitus.

Materials & Methods

The present study was conducted among 90 patients with type II diabetes mellitus of both genders. All subjects were informed regarding the study and written consent was obtained.

Data such as name, age, gender etc. was recorded. Subjects were tested for fasting and random blood sugar level. Assessment of glycated hemoglobin (HbA1C) was also performed.

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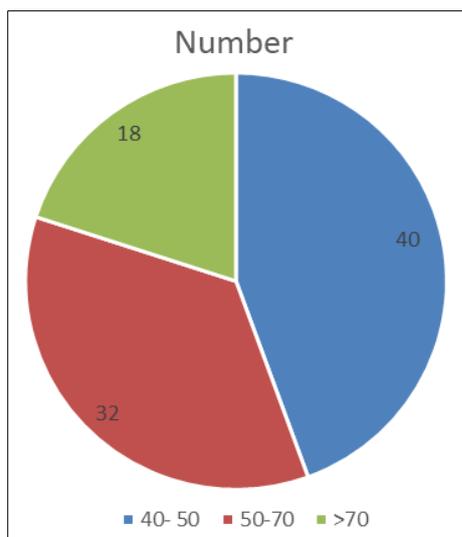
10 ml of venous blood was obtained for assessment of uric acid level. Results thus obtained were subjected to statistical analysis using Chi- square test. P value less than 0.05 was considered significant.

Results

Table 1: Age wise distribution

Age group (Years)	Number	P value
40- 50	40	0.02
50-70	32	
>70	18	

Table I, graph I shows that age group 40-50 years had 40, 50-70 years had 32 and >70 years had 18 patients. The difference was significant ($P < 0.05$).

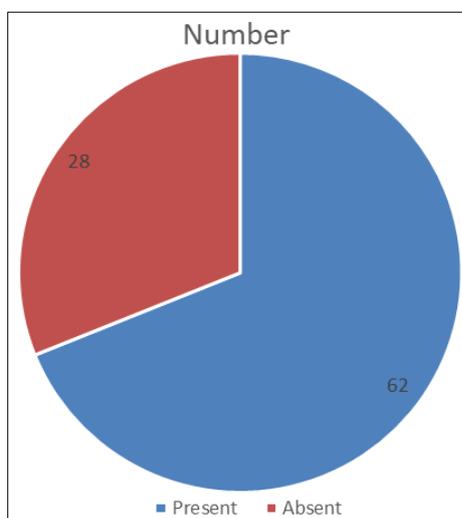


Graph 1: Age wise distribution

Table 2: Presence of hyperuricemia in subjects

Hyperuricemia	Number	P value
Present	62	0.01
Absent	28	

Table II, graph I shows that hyperuricemia was present in 62 and absent in 28. The difference was significant ($P < 0.05$).



Graph 2: Presence of hyperuricemia in subjects

Discussion

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. Vascular complications of diabetes mellitus or classified in to microvascular and macro vascular complications. Diabetes is a chronic illness for which there is no cure [9]. Management mainly concentrates on maintaining close to normal blood sugar levels without causing hypoglycemia. Knowing about the diseases is very important in the treatment. Complications are less common in patient with good control. The goal in diabetes is aHbA1C ≥ 6.5 [10]. Other complications of diabetes should be monitored. Habits like smoking, increased cholesterol, fat, high BP should be controlled. Special foot wear available for patient with diabetes to reduce ulceration [11, 12]. The present study was conducted to assess serum uric acid as a risk factor for diabetes mellitus.

In present study, age group 40-50 years had 40, 50-70 years had 32 and >70 years had 18 patients. Kodama *et al.* [13] found that a total of 120 cases of type 2 Diabetes mellitus, out of which there were 69 males (57.5%) and 51 females (42.5%), with a mean age of 59.04 ± 13.47 years. Mean FBS was 186.10 ± 77.53 mg/dl with majority of the subjects having elevated FBS. Mean PPBS of 274.94 ± 108.66 mg/dl and of HbA1c 8.15 ± 1.7 was observed. The uric acid of majority number of our study participant males (65.22%) had level of ≥ 7.4 , with a mean of 9.53 ± 4.38 . Mean blood urea and serum creatinine levels were 46.91 ± 15.13 and 1.44 ± 0.29 respectively. There was significant association seen between uric acid levels and urine albumin, serum creatinine, twenty four hour urinary albumin, FBS and PPBS levels and HbA1c levels.

We found that hyperuricemia was present in 62 and absent in 28. Liang *et al.* [14] 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. The goal of this study was to evaluate the relationship between the increases in serum uric acid level and the severity of DR and albuminuria in Taiwanese patients with type 2 DM. 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 (odds ratio (OR), 1.227; 95% confidence interval (CI) = 1.015–1.482; $p = 0.034$) and DR (OR, 1.264; 95% CI = 1.084–1.473; $p = 0.003$). They also demonstrated that there was a higher concentration of serum uric acid in the patients with more severe albuminuria and DR. In conclusion, an increased serum uric acid level was significantly correlated with the severity of albuminuria and DR in Taiwanese patients with type 2 DM.

Fukui *et al.* [15] reported a significantly positive association between SUA concentration and the degree of urinary albumin excretion after adjusting for eGFR in men with type 2 DM. They found a statistically significant relationship between SUA concentration and the severity of albuminuria

classified into three grades. Two prospective cohort studies reported an association between SUA and the development or progression of DN in patients with type 1 DM and type 2 DM, respectively.

Conclusion

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

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