



SERUM URIC ACID LEVELS IN TYPE 2 DIABETES MELLITUS – A CASE CONTROL STUDY IN A TERTIARY CARE HOSPITAL

Dr.Sathyanindhini .M

Final year Postgraduate, Department of Biochemistry, Coimbatore Medical College, Coimbatore, Tamilnadu, India.

**Dr.K.R.Minu
Meenakshi Devi***

Associate Professor, Department of Biochemistry, Coimbatore Medical College, Coimbatore, Tamilnadu, India.*Corresponding Author

ABSTRACT **Background:** The pathogenesis of T2DM is complex, involving various interacting factors. Its increased rate is a great concern worldwide. Uric acid has prooxidant effects by increasing ROS production. UA mediated oxidative stress-induced lipid peroxidation, DNA damage & activation of inflammatory factors lead to cellular damage and it also affects insulin gene expression. UA decreases endothelium derived NO and promotes vascular smooth muscle proliferation and also upregulates the expression of platelet-derived growth factor and monocyte derived chemotactic protein-1. This would enhance the atherogenesis and its progression. This study attempts to find the relationship between serum uric acid and Type 2 Diabetes. **Methodology:** It is a case control study conducted in Coimbatore medical college hospital. 55 diabetic patients & 55 healthy controls were included in the study. Blood fasting glucose, Serum uric acid, Total cholesterol, Triglycerides & HDL are measured among two groups. **Results:** Serum uric acid levels are significantly increased ($p < 0.05$) in diabetic patients than controls and it shows positive correlation with dyslipidemia in diabetic patients. **Conclusion:** Regular measurements of uric acid in type 2 diabetes patients could help physicians in clinical practice to be alerted to the development of chronic complications.

KEYWORDS : Uric acid, Type 2 diabetes mellitus, Dyslipidemia

INTRODUCTION

Type 2 Diabetes mellitus, a metabolic disorder has been undoubtedly emerging as a most challenging health problem nowadays and its pathogenesis involves interactions among various genetic and environmental factors. The number of patients diagnosed with macrovascular and microvascular complications due to T2DM is rising every year¹

The World Health Organization (WHO) defines the term Diabetes Mellitus as a metabolic disorder of multiple etiology, characterized by chronic hyperglycemia with disturbances of carbohydrate, protein and fat metabolism, resulting from defects in insulin secretion or insulin resistance or both²

Uric acid is found to have pro-oxidant properties which increases the reactive oxygen species production such as Hydrogen peroxide. It induces lipid peroxidation, DNA damage³ and also it activates various pro-inflammatory cytokines that leads to cellular damage⁴. This oxidative stress affects the insulin gene expression and thereby decreases insulin secretion^{3,4,5}.

UA enhances the binding of ENPP1 (ectonucleotide pyrophosphatase/phosphodiesterase) to Insulin receptor, inhibits the trigger of insulin signaling pathway in an independent way⁶ irrespective of oxidative stress and inflammation. Thereby, Uric acid has an individual role in the appearance and progression of insulin resistance and also in the development of diabetes.

Thus, the link between the Uric acid and Diabetes is an interesting topic of research, but controversy still exists.

This study attempts to evaluate the serum uric acid levels in Type 2 Diabetes mellitus patients.

MATERIALS AND METHODS

This is a case control study done in a tertiary care hospital in south India. 55 patients were recruited from Diabetology OPD with Type II Diabetes mellitus of varying duration (Cases) on oral hypoglycemic drugs and 55 healthy controls are included in the study.

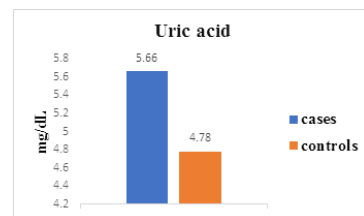
After getting Institutional ethics committee approval, blood samples were collected and were analysed for fasting blood glucose, Serum uric acid, Total cholesterol, Triglycerides & HDL among two groups by fully automated analyser.

The statistical analysis of the results was performed by using the Statistical Package for Social Sciences (SPSS) for IBM version 20.0. Independent "t"-test was used for testing difference significance, P

value < 0.05 considered statistically significant. For correlation coefficient, Pearson correlation was used.

RESULTS

Figure 1: Bar diagram shows mean values of Uric acid among Cases and Controls



The mean Uric acid values among cases and controls are 5.66 and 4.78 respectively

Table 1 shows mean values of various parameters among cases and controls

PARAMETERS	CASES	CONTROLS	p VALUE
FBS	179.67	92.18	<0.0001
URIC ACID	5.66	4.78	0.0003
CHOLESTEROL	220.45	143.92	<0.0001
TRIGLYCERIDE	177.14	103.78	<0.0001
HIGH DENSITY LIPOPROTEIN	24.69	50.38	0.0466

DISCUSSION

This study found that serum uric acid values are higher in type 2 diabetes mellitus patients (5.66) than healthy controls (4.78). This is in accordance with Rothare et al⁷ showed high uric acid levels in diabetics. The increased uric acid levels in Diabetes mellitus may be due to weight loss and muscle wasting. Chronic high glucose levels in the blood will cause tissue injury, which in turn leads to increasing non protein nitrogenous substances like uric acid⁸. Pearson correlation was used to determine the correlation of Cholesterol, Triglyceride and HDL to Uric acid. A significant positive correlation was observed between Cholesterol, Triglyceride with uric acid and inverse correlation was observed between High density lipoprotein with uric acid⁹. Increased uric acid levels cause mitochondrial oxidative stress, which increases fat storage without high caloric intake. Furthermore, insulin resistance may develop because of this mitochondrial oxidative stress in islet cells and the encouragement of fatty liver production which also augments dyslipidemia.¹⁰

Table :2 shows correlation between serum uric acid and lipid profile in type 2 Diabetes mellitus

GROUP	VARIABLE COMPARED	PEARSON CORRELATION	p VALUE
CASES	Uric acid Vs Cholesterol	0.472	0.0002
	Uric acid Vs Triglyceride	0.282	0.036
	Uric acid Vs HDL	-0.268	0.044

CONCLUSION

Uric acid levels are found to be closely related to development of diabetes and thereby, its complications. Frequent monitoring of serum uric acid levels in diabetic patients may help in early detection of its complications. Further molecular studies are required to explore the effect of uric acid on diabetes.

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