ORIGINAL RESEARCH PAPER

General Medicine

SERUM URIC ACID AS A MARKER OF CAD IN TYPE II DM

KEY WORDS: Serum Uric Acid, Diabetes Mellitus, Coronary Artery Disease

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ABSTRACT

BACKGROUND: The Morbidity and mortality due to non-communicable diseases specially attributed to diabetes mellitus (DM) and coronary Artery disease (CAD) is rising rapidly in India, causing nearly 5.8 million deaths per year annually. Considering the strong association between the levels of serum uric acid (SUA) and the occurrence of coronary atherosclerosis in subjects with type 2 diabetes mellitus, the current study has been undertaken to assess the factors influencing the serum uric acid levels in patients with type 2diabetes mellitus.

AIMS AND OBJECTIVES: 1.To study the level of SUA in patients with type 2 DM, 2.To establish the association of elevated serum uric acid concentration as a risk factor for CAD in type–2 diabetes patients.

RESULTS: Mean serum uric acid value is significantly higher in type II diabetes patients (5.76±1.15) than controls (3.39±0.56). Mean serum uric acid value is significantly higher in Diabetic patients with CAD (6.115±0.87) than non CAD patients (5.43±0.59).

CONCLUSION: Level of serum uric acid is related to duration of diabetes mellitus. It is an independent predictor of CAD in DM patients thus can be used as a marker of CAD in type II DM patients.

INTRODUCTION

Morbidity and mortality due to Diabetes Mellitus (DM) and Coronary Artery Disease in India are increasing rapidly. Nearly 58 lakh deaths are attributed to above diseases every year [1, 2]. Increase in insulin resistance is associated with DM and Metabolic Syndrome (MS). Components of MS namely Hyperinsulinemia, Hypertension, Hyperlipidemia and Hyperglycemia are independently as well as in combination associated with increased risk of Cardiovascular Diseases [3,4]. Elevated Serum Uric Acid (SU), is associated with increased risk of Hypertension [5,6,7], cardiovascular disease [8, 9] and Diabetes[10]. As limited studies are available on linking serum uric acid as a risk factor for DM and CAD and that too are conflicting, a study to establish relationship between SUA, DM and CAD is needed.

METHODS

Study setting: Present study was conducted at Dept. of Medicine, S.S. Medical College and SGM Hospital, Rewa (M.P.).

Study Design: Cross Sectional Observational study.

Duration of Study: Study was conducted during April 2017 and March 2018.

Sample Size: 500 cases and 250 controls were included in study.

Inclusion Criteria:

1. Patients with type 2 diabetes mellitus (patients were taken irrespective of their glycemic control and their duration of diabetes).
2. Patients were above 30 years of age were included.
3. Both sexes were included.

Exclusion criteria:

1. Patients with renal failure.
2. Pregnant and lactating mothers.
3. Patients who were on long term diuretics & steroids.
4. Patients who were regularly consuming alcohol.
5. Patients who were on antimetabolite and chemotherapy drugs.
6. Patients who had hepatic & metabolic disorders.
7. Patients who had PVD/CVA/Pulmonary tuberculosis.
8. Renal transplant patients.
9. Patients suffering from gout.

The study was approved by Institutional Human Ethical Committee. Informed written consent was obtained from all participants. Confidentiality of participants was maintained throughout the study.

STUDY PROCEDURE:

Selected data was obtained from cases and controls according to preformed proforma. Detailed history was taken regarding onset, duration, treatment of DM, risk factors for atherosclerosis, smoking and alcoholism. Family history of DM and CAD was taken. General physical examination including anthropometric measurements like height, weight, BMI and Waist Hip ratio were done. Biochemical investigations including CBC, LFT, RFT, RBS, FBS, PPBS, Lipid profile,SUA, Serum creatinine were done.

Estimation of serum uric acid

Serum uric acid was measured with reagent of Trinder's reaction, enzymatic and Calorimetry method, on the principal of uricase-peroxidase method. Intensity of color formed in the reaction is proportion to uric acid concentration.

Hyperuricemia

Hyperuricemia is defined as >7.0mg/dl in men and >6.0mg/dl in women [11].

Statistical Analysis

Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups Inter group analysis) and chi square test has been used to analyze the data having ordinal variables, Significant figures were analyzed, Suggestive significance (P

value:0.05<P).

RESULTS

In 500 cases majority (52%) were males, obese, dyslipidemic. CAD was present in 32% and 34% were hypertensive. In 250 controls majority were females, non-obese, non CAD, non-hypertensive. **(Table 1)** Mean serum uric acid of all cases of DM Type 2 was higher than controls with value 5.76 ± 1.15 mg/dl and was statistically ***Significant with P < 0.05.*** **(table 2).** In cases of diabetes mellitus on the basis of CAD, Serum uric acid level >7.0 was seen in cases with CAD more than non CAD patients and data was highly significant. Serum Uric acid ≤ 4.0 in cases without CAD this data was also significant. **(table3).**

Table No. 1 Distribution of Control Population according to Various Variables and their comparison with cases

Sub-Groups		Case Of type 2 Diabetes Mellitus		Controls		Significance
		No.	%	No.	%	
Sex	M	262	52.40	119	47.60	P=0.215 (CS=1.536)
	F	238	47.60	131	52.40	
BMI	≤25	235	47.00	134	64.00%	P=0.088 (CS=2.905)
	>25	265	53.00	116	36.00%	
Dyslipidemia	Present	335	67.00	75	30.00%	P<0.05
	Absent	165	33.00	175	70.00%	
CAD	Present	160	32.00	55	22.00%	P<0.05
	Absent	340	68.00	195	78.00%	
Hypertension	Present	173	34.60	68	27.20%	P<0.05
	Absent	327	65.40	182	72.80%	

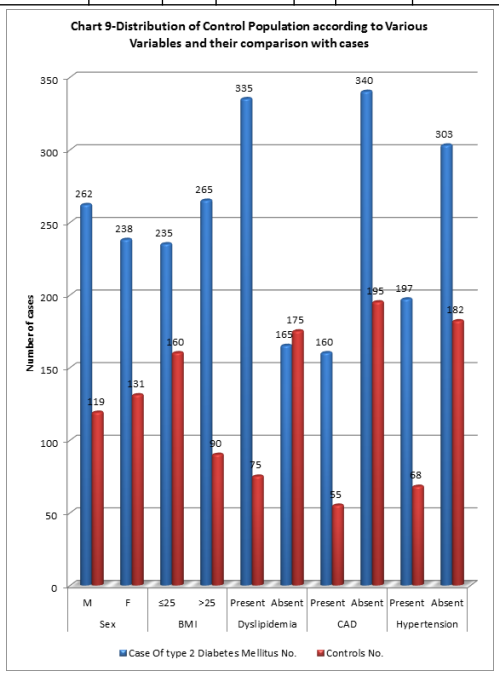
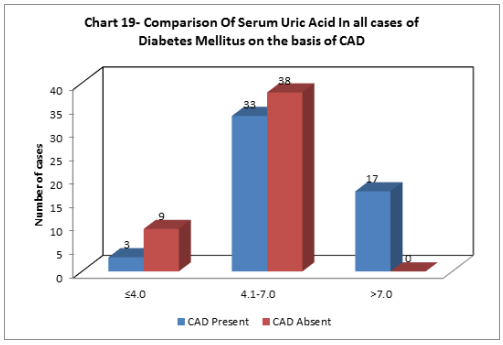


Table No. 2 Comparison of serum uric acid level in Diabetic Patients with Controls

All Cases Of DM Type 2 Vs Controls	Number	Mean serum uric acid	S.D.	Significance
Cases Of DM Type 2 DM	500	5.76	1.15	P value <0.05
Controls	250	3.39	0.56	

Table No.3 Comparison of Serum Uric Acid in cases of Diabetes Mellitus on the basis of CAD

Serum Uric Acid	CAD Present	CAD Absent	Significance
≤4.0	10	45	P<0.05
4.1-7.0	97	178	P>0.05
>7.0	53	12	P<0.05



DISCUSSION

In our study the mean serum uric acid in diabetic patients was significantly higher when compared with controls with values 5.76±1.15mg/dl and 3.39± 0.56mg/dl respectively. In **Sudhindra Rao M.et al**[12] study mean serum UA level was lower in control group (3.84mg/dl), rose in prediabetics (4.8mg/dl) and again decreased in diabetics (3.78mg/dl). **M. Modan et al**[31] study showed that increased serum UA level is a feature of hyperinsulinemia/insulin resistance. **Nakanishi N et al**[14] study, concluded that serum UA level is closely associated with an increased risk of hypertension and type 2 DM.

In patients with type 2DM, incidence of CAD were significantly higher in patients who had SUA level >7.0mg/dl. Incidence of CAD were significantly less when SUA level was <4.0mg/dl. In 2009 **Sinan Devici O et al**[15] study, a positive correlation was concluded between SUA level and incidence of CAD. In 2010 **Cezero C, Ruilope LM**[16] study found relationship between high serum UA level and Cardiovascular risk is extensive.

CONCLUSION:

Mean serum UA level is higher in Diabetic patients, this suggests that DM is a normouricemic condition with hyperuricemic condition. Mean serum acid level was highest in subgroup of CAD patients, it suggests that serum UA is a risk factor for CAD.

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