

CORONARY ARTERY DISEASE WITH HYPERURICEMIA IN TYPE 2 DIABETES MELLITUS

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Abstract:

Background: Hyperuricemia or elevated serum uric acid level (SUA) is a biochemical entity that is gaining increasing importance as a cardiovascular risk factor. Hyperuricemia has been reported to be associated with the onset of diabetes mellitus or metabolic syndrome. Several studies have reported the relationship between HUA and diabetic macroangiopathies, such as coronary heart disease, stroke and peripheral arterial disease.

Objectives: To study and Compare mean Serum Uric Acid levels in Patients of both Known & New Case Of Diabetes Mellitus on with presence and absence of Coronary Artery Disease (CAD).

Materials and methods: All the patients satisfying the inclusion and exclusion criteria were grouped as under as Known cases i.e. Patients of type II Diabetes Mellitus with or without CAD, New cases i.e. Patients of type II Diabetes Mellitus with or without CAD. All the patients were studied for the following variables such as Age (Years) BMI (kg/m²), Body Mass index, FBS(mg/dl) PPBS(mg/dl) HbA1C (%) : Glycosylated haemoglobin, Serum Uric acid levels (mg/dl).

Results: 55.20% of known cases of type 2 DM and 26.20% of new cases of type 2 DM were with Coronary Artery Disease (CAD). The mean serum Uric acid levels were high 6.37mg/dl in patients of known cases of type 2 DM with Coronary Artery Disease (CAD) where as 5.37mg/dl in new cases of type 2 DM with Coronary Artery Disease (CAD). Hyperuricemia i.e. mean serum uric acid above 7mg/dl was highly significant in cases of type 2 DM with Coronary Artery Disease (CAD).

Conclusion: The mean Serum Uric acid levels were found higher in known cases of type 2 DM with CAD then with newly diagnosed cases revealing Hyperuricemia in CAD. Thus it can be very well concluded that Hyperuricemia can be predictor or risk factor for CAD in type 2 Diabetes mellitus.

Key words: Hyperuricemia, Coronary Artery disease (CAD), Type 2 diabetes mellitus, serum uric acid level

INTRODUCTION

Hyperuricemia or elevated serum uric acid level (SUA) is a biochemical entity that is gaining increasing importance as a cardiovascular risk factor¹. HUA has been reported to be associated with the onset of diabetes mellitus or metabolic syndrome. Several studies have reported the relationship between HUA and diabetic macroangiopathies, such as coronary heart disease, stroke and peripheral arterial disease. Type 2 diabetes mellitus is also well-known as a major risk factor for atherosclerotic disease. Serum uric acid level have been shown to be higher in patients with diabetes mellitus than in the population without glucose intolerance as well as uric acid levels are found to be elevated in the individuals with impaired glucose tolerance other than type 2 diabetes. Atherosclerosis and Coronary Artery Disease are the most common cardiac manifestations associated with Hyperuricemia.²

Hyperuricemia has also been found to be associated with obesity and insulin resistance, and consequently with type 2 diabetes. Further potentially important biological effects of uric acid relate to endothelial dysfunction by inducing anti proliferative effects on endothelium and impairing nitric oxide production and inflammation. Some evidences suggest that uric acid may exert a negative effect on cardiovascular disease by stimulating inflammation, which is clearly involved in the pathogenesis of cardiovascular disease¹. The serum uric acid level is elevated in as many as one third of untreated hypertensive patients. With long-term high-dose diuretic therapy, Hyperuricemia appears in another one third of patients as a consequence of increased proximal tubule reabsorption accompanying volume contraction and may precipitate acute gout. Hyperuricemia may also potentiate atherosclerosis and hypertension.^{3, 4, 5} In view of the above a study was planned to find out levels of Uric acid and Hyperuricemia in Type 2 diabetes mellitus Patients with Coronary artery disease.

AIMS AND OBJECTIVES

1. To find out mean Serum Uric Acid Level in Patients with Diabetes Mellitus with or without Coronary Artery Disease.
2. To Compare o Serum Uric Acid levels in Patients of both Known & New Case Of Diabetes Mellitus on the Basis of presence and absence of Coronary Artery Disease (CAD)

3. To find out the proportion of Coronary Artery Disease (CAD) in patients of type 2 DM

METHODOLOGY

This was a descriptive cross sectional study done in department of Medicine care at Pravara Rural Hospital, Loni over a period between September 2015 to August 2017. Total 100 Patients of type 2 diabetes mellitus (Known and new cases), who were admitted in Pravara rural hospital Loni were enrolled for the study during the study period. Patients satisfying the following eligibility criteria were selected for the study.

INCLUSION CRITERIA

1. Patients who had history of diabetes mellitus type 2 and on treatment with Coronary artery disease
2. New Cases of Diabetes Patients with fasting blood sugar >126mg/dl and/or post prandial blood glucose >200mg/dl. RBS>200mg/dl symptoms of diabetes (polydypsia, polyuria and polyphagia) with Coronary artery disease
3. Patients who were ready to give consent for study
4. All adult patients
5. Patients of either gender

EXCLUSION CRITERIA

1. Patients who had history of diabetes mellitus type 2 with creatinine >1.4mg/dl.
2. Patients on uricosuric drugs.
3. Patients with history of any malignancy.
4. Patients on long term treatment on salicylates and other drugs which causes Hyperuricemia

STUDY CONDUCT

All the patients satisfying the above inclusion and exclusion criteria were grouped as under:

- **Known cases** : Patients of type II Diabetes Mellitus with or without CAD
- **New cases** : Patients of type II Diabetes Mellitus with or without CAD

Variables studied:

All the patients were studied for the following variables :

1. Age (Years) : Age was ascertain from the records
2. BMI (kg/m²) : Body Mass index
3. FBS(mg/dl) : Fasting Blood sugar
4. PPBS(mg/dl) : Post prandial blood sugar level
5. HbA₁C (%) : Glycosylated haemoglobin
6. Serum Uric acid levels (mg/dl) :

Those above 7 mg/dl were labelled with Hyperuricemia and those in between 2 to 6 were considered normal where as above 6 was considered to be high .

All the investigation were carried out at admission or at appearance in the OPD

ETHICAL CONSIDERATION

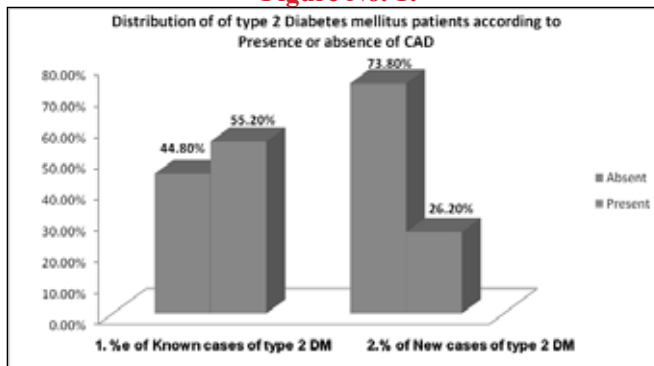
Approval from IEC (Institutional Ethical Committee) was dully taken and study was done after ethical clearance

STATISTICAL ANALYSIS :

All descriptive statistics were used such as mean, proportion as the variables were on ratio scales inferences were drawn using Z test of significance

OBSERVATIONS AND RESULTS

Figure No. 1:

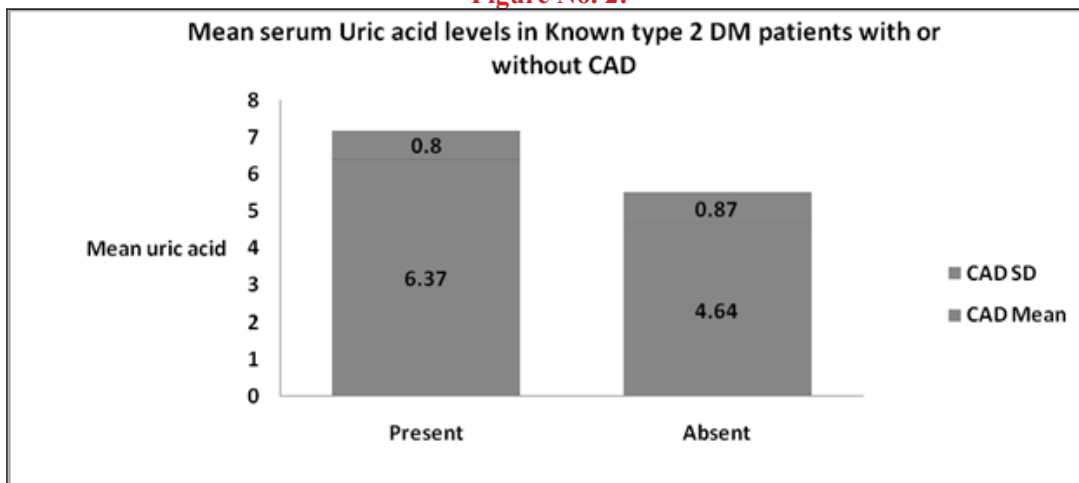


55.20% of known cases of type 2 DM and 26.20% of new cases of type 2 DM were with Coronary Artery Disease (CAD)

Table No. 2 : Mean of Profile Variables of Cases

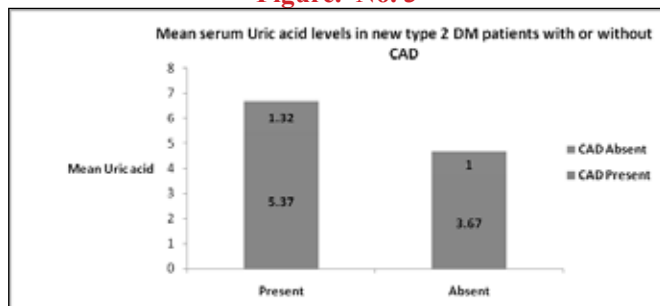
Variable	Known Case Of type 2 Diabetes Mellitus		New Case Of type 2 Diabetes Mellitus		Significance
	Mean	S.D.	Mean	S.D.	
Age (Years)	61.52	11.149	55.07	9.923	0.004*
BMI (kg/m ²)	25.24	2.88	24.52	3.16	0.242
FBS(mg/dl)	164.51	58.73	202.14	72.76	0.005*
PPBS(mg/dl)	227.01	65.5	275.1	74.23	0.001*
HbA ₁ C (%)	8.93	1.49	9.91	1.37	0.001*

Figure No. 2:



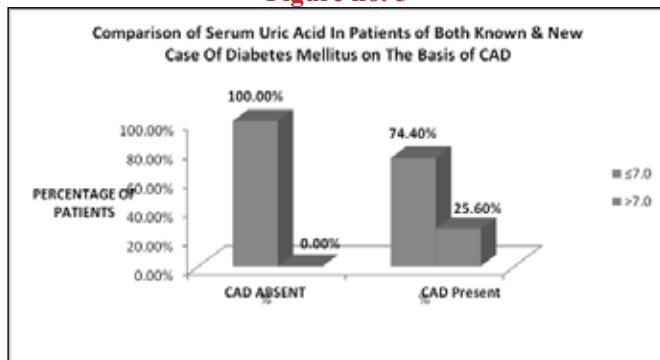
The mean serum Uric acid levels were high 6.37mg/dl in patients of known cases of type 2 DM with Coronary Artery Disease (CAD)

Figure. No. 3



The mean serum Uric acid levels were high 5.37mg/dl in patients of new type 2 DM with Coronary Artery Disease (CAD)

Figure no. 5



Hyperuricemia i.e. mean serum uric acid above 7mg/dl was highly significant in cases of type 2 DM with Coronary Artery Disease (CAD)

DISCUSSION

In this study the total number of patients of type 2 Diabetes Mellitus studied were (n=100) with 50% were Known Cases of type 2 Diabetes Mellitus, 50% were newly diagnosed Cases of type 2 Diabetes Mellitus. Coronary Artery disease (CAD) was significantly prevalent in Known Cases of type 2 Diabetes Mellitus (55.20%) as compared to New Case of type 2 Diabetes Mellitus (26.20%). (Figure 01)

Mean age in Known Cases Of DM Type 2 and newly diagnosed cases of DM Type 2 was 61.52 ± 11.15 and 55.07 ± 9.92 respectively. In patients in Known Cases Of DM Type 2; ,mean BMI is $25.24 \pm 2.88 \text{ kg/m}^2$; mean FBS = $164.51 \pm 58.73 \text{ mg/dl}$; mean PPBS = $227.01 \pm 65.5 \text{ mg/dl}$. This suggests most of cases are pre obese , with

hyperglycemia

In patients with New diagnosed DM Type 2; mean BMI is $24.52 \pm 3.17 \text{ kg/m}^2$; mean FBS = $202.14 \pm 72.76 \text{ mg/dl}$; mean PPBS = $275.1 \pm 74.23 \text{ mg/dl}$. This suggests most of cases are normal BMI, with hyperglycemia. (Table No 1).

In Known Case of DM Type 2 group, patients with history of CAD had higher mean serum uric acid with value $6.37 \pm 0.80 \text{ mg/dl}$ and were significantly higher than Non CAD group. (Figure 02)

.In new Case of DM Type 2 group, patients with CAD had higher mean serum uric acid with value $5.37 \pm 3.67 \text{ mg/dl}$ and was significantly higher than Non CAD group. (Figure 03)

Nadkar MY etal⁶ found serum uric acid levels were higher in patients of acute myocardial infarction (CAD) correlated with Killip class. Serum Uric acid of patients was 5.23 ± 1.95 and controls were 3.78 ± 0.74 . Hypertensives had serum Uric acid 5.38 ± 2.05 , Diabetes mellitus patients had serum Uric acid 5.50 ± 2.14 . In Previous IHD cases serum Uric acid 7.07 ± 2.024 . These findings are in accordance with our study. This reveals Hyperuricemia in patients of type 2 DM with CAD.

Our findings reveals that Hyperuricemia is significantly higher in known cases of type 2 DM with CAD, 25.5% patients who had Coronary artery disease had showed uric acid levels above 7mg/dl. Thus there is significant high uric acid levels (Hyperuricemia) with CAD and type 2 DM. (Figure 04)

Our findings are in similarity with Choi HK et al,⁷ Nadkar MY⁶, Uzma bano et al⁸ study, showed that, Hyperuricemia is significant higher in CAD patients.

In Patients with DM Type 2 serum Uric acid >7.0 was significantly associated with CAD. Uric acid was significantly higher in CAD patients with Known Case Of DM Type 2 in earlier observations by student T test.

CONCLUSION

The mean Serum Uric acid levels were found higher in known cases of type 2 DM with CAD then with newly diagnosed cases revealing Hyperuricemia in CAD. Thus

it can be very well concluded that Hyperuricemia can be predictor or risk factor for CAD in type 2 Diabetes mellitus.

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