Plasma Uric Acid Levels in Relation to Plasma Cholesterol Levels in Type-2 Diabetes Mellitus

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1

Abstract

Uric acid, the prime end product of purine catabolism, has been implicated in diabetes mellitus as well as in hyperlipidemias. Its significance in diabetic hypercholesterolemia is not established. A study was under taken to assess the relationship of plasma cholesterol with plasma uric acid in type-2 diabetes mellitus subjects. A fasting blood sample was collected from normal as well as type-2 diabetic subjects, the separated plasma was employed for the estimation of glucose, cholesterol and uric acid levels. It is observed that there is a proportional rise in uric acid in type-2 diabetic subjects, suggesting that plasma uric acid levels along with total cholesterol levels aids to asses the diabetes induced dyslipidemia as well as to control the diabetic dyslipidemia induced complications in type-2 diabetes mellitus.

Index terms— plasma uric acid, plasma cholesterol, type-2 diabetes mellitus, vascular complications.

1 Introduction

ric acid, the prime end product of purine catabolism is implicated in diabetes mellitus. Suggesting a possible role of insulin in nucleotide metabolism. It has been claimed by few research workers that plasma uric acid levels are elevated in diabetes mellitus (1)(2)(3)(4)(5)(6)(7)(8)(9)(10)(11).In earlier report from our laboratory the uric acid elevation in diabetes mellitushas been conclusively established as due to raised nucleotide catabolism (12). in type 2 diabetic subjects to establish the inter relationship of plasma uric acid levels with diabetes induced Hypercholesterolemia.

The type-2 diabetic subjects (both male and females) attending the medical Out Patient Department of Subbaiah Medical College Hospital, Purle, Shimoga. were randomly selected, similarly normal subjects (both male and females)

were randomly taken from employees of medical college and hospital. Fasting blood samples were collected from normal as well as selected diabetic subjects (The subjects having orthopedic & renal problems were excluded from the study) and were allowed to clot and plasma samples were separated by centrifugation at 3500rpm for 8mins, the separated samples were employed for estimation of Total Cholesterol (15) , Uric acid (16) and Glucose (17).

The results obtained were statistically analyzed using student t-test.

2 III.

3 Results

The diabetic subjects were divided into two groups depending on their plasma cholesterol level. Group 1-NormoCholesterolemic Diabetic Subjectshaving plasma cholesterol levels<200mg/dl and Group 2-HypercholsterolemicDiabetic Subjects-having plasma cholesterol levels >200mg/dl.The results obtained in the present study are given in Table-1 and Table-2 Table **??**1 narrates fasting plasma glucose levels as well as plasma uric acid levels in normal subjects and in type-2 diabetic subjects. It is evident from the table that uric acid levels are significantly elevated (p<0.001) in type2 diabetic subjects as compared to normal.

Table-2 depicts the values of plasma total cholesterol and plasma uric acid levels in group1 diabetic subjects (plasma cholesterol<200mg/dl) and in group2 diabetic subjects (plasma cholesterol >200mg/dl). It is clear from the table that there is significant elevation in plasma uric acid levels in hypercholesterolemic subjects as compared to normal cholesterolemic subjects. The hyperglycemia observed in diabetes mellitus if not controlled may lead to various life threatening complications including micro and macro vascular diseases (13). A proper control, hence becomes the priority of management of diabetes mellitus. It is known that in dyslipidemia, one of the general complications ofdiabetes mellitusplasmatotal cholesterol levels are seen elevated (14). Further it is shown by few research workers thatplasma uric acid levels are elevated in hyperlipidemias including hypercholesterolemia. The present work was carried out

4   Materials and Methods

5   II.

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6   Discussion

Uric acid, the end product of purine catabolism in humans, has been suggested to have a close relationship with cardiovascular diseases , where an increase in plasma uric acid levels have been observed (18)(19)(20). Further it has been shown that plasma uric acid levels are elevated in hyperlipidemia specifically hypertriglyceridemia (21)(22)(23). The elevated plasma uric acid levels observed in our present studies are in agreement with our earlier reports(1-11) as well as with earlier findings (12) and the rise observed may be due to increased purine turnover as suggested in our earlier communication from our laboratory (12) or may be due to diabetic dyslipidemia induced increased vascular damage(13) A parallel increase in plasma uric acid levels along with plasma cholesterol levels in the present study in type-2 diabetic subjects suggests a possible relationship between plasma uric acid level and plasma lipid profile specifically plasma cholesterol. Kelley and Palella (24) have observed a rise in uric acid levels in hypertriglyceridemia ,hypertension, obesity and diabetes mellitus (24,25) The increase observed in uric acid levels in the present studies indicates a definite rise in uric acid levels in diabetic subjects with a close relationship to cholesterol levels. The observed increase in uric acid levels in type-2 diabetic subjects indicates a positive relationship of uric acid levels with cholesterol levels in type-2 subjects(refer Table-2) suggesting, the rise in uric acid parallel increases in cholesterol levels. Many life threatening complications of type-2 diabetes mellitus specifically micro angiopathy have been attributed to diabetes induced dyslipidemia. As there is a parallel rise in uric acid along with cholesterol levels in type-2 diabetic subjects an estimation of uric acid levels in serum may be an additional significant criteria to assess 3. Statistical significance is given by * $p>0.05$, ** $p>0.01$, *** $p>0$. [1]

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[1]Plasma Uric Acid Levels in Relation to Plasma Cholesterol Levels in Type-2 Diabetes Mellitus

Figure 1: U

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	Fasting Plasma Glucose mg/dl	Uric acid mg/dl
Normals (11)	103.82 + 13.80	3.688 + 0.732
Diabetics (58)	196.93 *** + 15.03	7.033 *** + 1.700

Note:
1.

Figure 2: Table 1 :

2

	Plasma Cholesterol mg/dl	Plasma Uric acid mg/dl
Normo	159.56	5.676
Cholesterolemic Diabetic subjects	+	+
(25)	22.99	0.829
Hyper Cholesterolemic Diabetic subjects	212.90 ***	8.203 ***
subjects	+	+
(29)	40.69	1.348

Note:
1.

Figure 3: Table 2 :

74   beneficial in type-2 diabetic subjects to asses the diabetic dyslipidemia induced vascular complications.

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6 DISCUSSION

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