

THE ROLE OF SERUM URIC ACID AS AN EXTRA RISK FACTOR IN CORONARY ARTERY DISEASE OF SIDDIPET POPULATION- A CLINICAL PANORAMA

Biochemistry

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ABSTRACT

Background: Uric acid can serve as an important antioxidant. Elevated uric acid was an independent risk factor for Coronary Artery Disease the present study was designed to determine the role of serum uric acid level in coronary artery disease patients of Siddipet population.

Methods : The present cross- sectional study was carried out in the Department of Biochemistry at R.V.M Institute Of Medical Sciences And Research Center, Siddipet, Telangana. Total number of subjects were 150. Out of this 75 were controls, 75 were CAD patients. Estimation of uric acid by PAP method. All these parameter were analyzed by spectrophotometer.

Results: No change in serum uric acid level between controls and CAD patients. Raised serum uric acid level in diabetes with coronary artery disease with other risk factor, in CAD patients.

Conclusion: It can be concluded that the role of serum uric acid in relation to coronary artery disease remains unclear.

KEYWORDS:

Serum uric, Coronary Artery Disease, Siddipet population.

INTRODUCTION :

Uric acid is the final excretory product of purine metabolism in humans. Uric acid can serve as an important antioxidant by getting itself converted to allantoin. Increased serum uric acid levels may favor microvascular diseases stimulating vascular smooth muscle cell proliferation¹.

Many epidemiological studies, after 1960s, confirm the relationship between the serum uric acid level and various cardiovascular diseases, such as arterial hypertension, atherosclerosis, stroke, acute and chronic heart failure². Hyperuricemia is positively associated with obesity, hypertension, and dyslipidemia, and that patients tend to have a clustering of these cardiovascular risk factors³.

Currently the leading causes of death globally, are Cardiovascular diseases (CVD), comprising coronary heart disease (CHD)⁴. Numerous drugs used frequently in patients with heart disease, such as losartan, diuretics, beta-blockers or acetylsalicylic acid may favor an increase in serum uric acid⁵.

In the First National Health and Nutrition Study (NHANES I), for every 1.01 mg/dl increase in the SUA level, the hazard ratio for total mortality and for cardiovascular mortality were 1.09 and 1.19 for men and 1.26 and 1.3 for women, respectively⁶. However, a great controversy arose as to whether elevated uric acid was an independent risk factor for Coronary Artery Disease⁷.

Higher levels of uric acid in men than in women at all ages have been attributed to the role of steroids in uric acid regulation, also called "uricosuric effect"⁸. Few studies demonstrated that high blood uric acid is not a risk factor for occurrence of cardiovascular disorders and it is suggested to the specialists to control the classic risk factors for cardiovascular disorders⁹.

By recent clinical trials, the effect of reduction of uric acid on prevention and even therapy of renal or cardiovascular diseases have been proven^{10,11}. The basis of atheroma is damaged endothelium causing platelet adherence and formation of clot leading to atherosclerosis¹².

On the basis of these facts the present study was designed to determine the role of serum uric acid level in coronary artery disease patients of Siddipet population.

MATERIALS AND METHODS:

This case – control study was carried out in the Department of Biochemistry at RVM Institute Of Medical Sciences And Research Center, Siddipet, Telangana. Total duration of our study was 12 months. Age between 30- 70 years was included in this study.

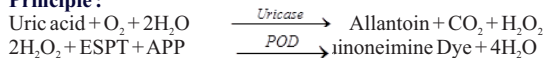
In this study total numbers of subjects were 150. Out of this 75 were controls, 75 were CAD patients who attended the medicine OPD/ Cardiology department OPD. Control groups were having normal blood pressure (BP), ECG, blood sugar level and apparently no other cardiac risk factor.

Each patient and control was interviewed conducted face to face by the researcher. The included questionnaire: history of duration of hypertension and anti-hypertensive drug treatment, congestive heart failure (CHF), angina pectoris, myocardial infarction (MI), diabetes mellitus, and prior stroke/transient ischemic attack. Blood samples were collected from 150 subjects. Fasting overnight venous blood sample (about 6 ml) was drawn by a certified phlebotomist into vacutainer plane tubes and serum separator tube and ethylenediaminetetraacetic acid (EDTA) tubes from all individuals.

ESTIMATION OF URIC ACID :-

Uricase - PAP method

Principle :



The absorbance at 546nm is directly proportional to uric acid concentration.

Serum cholesterol was measured by CHOD-POD method. Triglyceride was measured by GPO trinder method. HDL- cholesterol was measured by precipitating method. VLDL- cholesterol was calculated by dividing the triglyceride concentration by 5 and LDL- Cholesterol was calculated by using Friedwald's formulae. All these parameter were analyzed by spectrophotometer.

This study was approved by the Institute Ethical Committee (IEC). The statistical analysis were performed SPSS for windows version 20 program.

RESULTS:

Table No -1: Uric acid level at different age group between controls and CAD patients

Age groups	Subjects	Numbers of subjects	Range of uric acid	Mean±Sd	P value
30-40	Controls	12	1.5-5.7	4.97± 1.22	0.0001*
	CAD patients	8	3.7-10.1	5.90±2.50	
41-50	Controls	28	1.7-7.0	5.0±1.32	0.0001*
	CAD patients	27	4.4-10.8	7.23±2.02	
51-60	Controls	19	1.9-7.0	4.32±1.42	0.0001*

	CAD patients	20	4.9-12.1	8.88±1.92	
61-70	Controls	16	2.7-7.0	4.87±1.12	0.0001*
	CAD patients	10	4.9-14.1	9.72±2.32	

*Statistically significant (P<0.001), # Non significant (p>0.05).

The above table shows no change in serum uric acid level between controls and CAD patients. The observation made between the male subjects and female subjects has no significant variation of serum uric acid level.

Table No- 2: Comparison of serum uric acid level between controls and CAD patients

	Controls (N=75)	CAD patients (N=75)		
		Diabetes (N=24)	Hypertension (39)	DM+Hyper (12)
Range	1.5 -7.0	4.3-10.7	4.8-11.0	5.1-11.3
Mean±Sd	4.89±1.89	7.3±2.90	7.32±2.56	8.90±2.32

The above table results show various risk factors. Maximum risk factor was observed in Diabetes + hypertension patients

Table No-3: Comparison of lipid profile between control group and CAD patients

Parameters	Subjects		't' Value	P- value
	Controls (N=75)	CAD patients (N=75)		
	Mean±Sd	Mean±Sd		
Serum cholesterol	180.3±57.8	224.6±59.2	4.6369	0.0001*
Serum Triglyceride	152.8±55.7	177.3±54.6	2.7203	0.0073*
LDL- Cholesterol	112.8±52.3	151.7±53.2	4.5157	0.0001*
HDL- cholesterol	37.5±6.8	27.9±8.8	7.476	0.0001*
VLDL- cholesterol	30.8±10.7	35.7±11.5	2.701	0.0077*

Statistically significant (P<0.001), # Non significant (p>0.05).

As shown in table no:3 the Mean of control group and CAD patients the lipid profile was statistically significant.

DISCUSSION :

More than 50 years ago, a study reported an association between high serum uric acid and incidence of coronary artery disease¹³. Hyperuricemia could play a role in the pathogenesis of atherosclerosis. Increased uric acid production may overcome the oxidative stress associated with diabetes and its vascular complications¹⁴. In the Cardiovascular Health Study the incident heart failure occurred in 21 % participants with hyperuricemia and in 18% participants without hyperuricemia. Each 1 mg/dl increase in SUA was associated to 12 % increase in incident heart failure¹⁵. In heart failure, hyperuricemia is a marker of XO activation¹⁶.

In this present study serum uric acid in male and females was found to be non significant. Adel Johari Moghadam et al¹⁷ on his cross-sectional study demonstrated that the serum uric acid level in males was significantly higher than in females (PValue= 0.035). Sex and age have no effect on correlation between the level of uric acid and cardiovascular diseases. Elevated uric acid might induce CV and renal diseases involving mechanism characterized by oxidative stress, inflammation, and endothelial dysfunction¹⁸.

Sunny Chopra et al¹⁹ observed raised serum uric acid level in diabetes with coronary artery disease with other risk factor, in CAD patients. Our results are also similar to Sunny Chopra. A Study carried out in Finland in 1982 observed that raised uric acid levels were associated with obesity, impaired glucose tolerance, hypertension and family history of heart disease and these observations matched with findings of our study²⁰. Therefore, high levels of uric acid can be one of the important items of clinical prediction of coronary diseases²¹.

Serum cholesterol was prominent constituent of atherosclerotic plaque. The atherosclerotic plaque contains a considerable amount of uric acid which may increase platelet adhesiveness and potentiate thrombus formation²². In this study, results show the serum cholesterol level was elevated in CAD patients than controls.

In this study HDL-C level was higher in controls than CAD patients. Triglyceride and VLDL-C were not involving the development of CAD. In our study Statistically significant deference in triglyceride and VLDL-C. All our findings are similar to north Indian population¹⁹. So that there is no deference in regional variation in India.

CONCLUSION :

It can be concluded that the role of serum uric acid in relation to coronary artery disease remains unclear. The prevalence of the involvement was higher in male confirm the result of current study. Serum uric acid level was increased in CAD patients as compared to control groups.

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