Original Research Article

Serum uric acid level is not associated with severity and extent of coronary disease in patients with acute coronary syndromes - Our experience

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Abstract

Background: We evaluated Correlation of Serum Uric Acid level in patients with acute coronary syndromes with severity and extent of coronary disease

Materials and methods: Fifty-one patients with acute coronary syndromes between 25-60 years were included into the study. Patients with chronic kidney disease, gout, hematological malignancy, hypothyroidism, chronic alcoholism, receiving diuretic therapy, more than 2 grams per day of salicylate therapy, ethambutol, pyrazinamide, were excluded. Data regarding history, ECG, cardiac enzymes, serum uric acid, and angiographic details were recorded.

Results: The mean age of the study population was in 55.68± 5.83 years. The age, gender BMI, and co morbidities such as smoking, obesity, diabetes, hypertension and family history were not statistically significant across types of ACS, such as CSA, USA and MI. We noticed that uric acid levels were not significantly (P>0.05) across types of ACS. We also found significant correlations between uric acid levels at admission with age, hypertension and family history. However, there was no significant correlation of uric acid with the type of a number of vessels involved and Killip classification.

Conclusion: In the current study, serum UA level in patients with acute coronary syndromes is not associated with Killip class and extent of coronary vessels involved.

Key words

Serum Uric acid (UA), Kilip Class, Acute coronary syndrome (ACS), Killip class.

Introduction

Most epidemiological studies found a significant, graded, independent and specific association between the level of serum uric acid and cardiovascular morbidity and mortality [1, 2]. Uric acid (UA) takes part in cardiovascular diseases by inducing oxidative stress, inflammation, and endothelial dysfunction increased augmentation index and arterial stiffness in CAD patients, especially in the presence of ACS. [3].

Raise of uric acid by one mg/dL results in 26%increase in mortality. [4] UA levels increase with the rise in the severity of coronary artery disease and were positively correlated with Gensini scores [5]. Survival of patients suffering from ACS with hyperuricemia is worse compared to those without hyperuricemia during ICCU hospitalisation [6]. We carried out this study to correlate levels of serum uric acid in acute coronary severity and extent of coronary disease.

Materials and methods

Fifty-one patients with acute coronary syndromes between 25-60 years were included into the study. Patients with chronic kidney disease, gout, haematological malignancy, hypothyroidism, chronic alcoholism, receiving diuretic therapy, more than 2 grams per day of salicylate therapy, ethambutol, pyrazinamide, were excluded. Data regarding history, ECG, cardiac enzymes, serum uric acid, and angiographic details were recorded.

Data analysis

Statistical analysis was carried out after importing MS-excel spreadsheet to SPSS version 16. Binary and graded data was presented as numbers and percentages and analysed by chi-square test.Continuous data submitted as a mean and standard deviation and analysed by unpaired t test and ANOVA. Spearman correlations were assessed between serum uric acid and age, blood pressure, fasting blood sugars ACS, RWMA and Killip classification. A two-tailed probability value of less than 0.05 was considered statistically significant.

Results

It can be seen from the **Table – 1** and **Table - 2** that the mean age of the study population was in 55.68± 5.83 years. The age, gender BMI, and comorbidities such as smoking, obesity, diabetes, hypertension and family history were not statistically significant across types of ACS, such as CSA, USA and MI. We noticed that uric acid levels were not significantly (P>0.05) across types of ACS. We also found significant correlations between uric acid levels at admission with age, hypertension and family history. However, there were no significant correlations of uric acid with type of number of vessels involved and Killip classification (**Table - 3**). In our study four expired during five days follows up. All the patients had serum uric acid level more than 7.0 mg/dL at admission and were in Killip class IV. Serum Uric acid levels in severity of LV dysfunction and Extent of coronary disease was as per **Table – 4**.

Discussion

Uric acid is related to the cardiovascular disease. Elevated SUA is linked with poor outcomes in patients after MI complicated by reduced LV function, HF, or both [7]. It has also been shown that serum uric acid levels correlate with Killip classification [8]. Kojima, et al. suggested that a adding up serum uric acid information to Killip classification of the electrocardiogram is a good predictor of mortality in patients who had acute myocardial infarction [8]. Johnson RJ, et al. [9, 10] showed a higher serum uric acid levels in hypertensives at admission. We also found a significant correlation between serum uric acid level and hypertensives at admission. However, we did not find significant correlations between

diabetes and uric acid at admission. Tuomilheto, et al. and MY. Nadkar, VI. Jain, et al. [11, 12] suggested that there was no significant association between serum uric acid level and diabetic status. Killip classification is an indicator of the severity of heart failure and High serum UA level in patients with acute myocardial infarction (MI) was associated with higher Killip class but not mortality in one study [13]. We did bot find similar observations in our study. Elevated levels of uric acid were observed with higher Killip Class. Sunao Kojima, et al. and MY Nadkar et al. [8, 11] also found similar associations. An interaction of hyperuricemia and Killip class significantly affects the mortality of STEMI patients [14]. However, we did not study such interaction.In our study four expired during five days follows up. All the patients had serum uric acid level more than 7.0 mg/dL at admission and were in Killip class IV. Lazzeri, et al. [15] showed that hyperuricemia is not independently associated with early mortality when adjusted for renal function and the degree of myocardial damage.

Table – 1: Demographic, and uric acid details across types of acute coronary syndrome.

Parameters	Diagnosis	N	Mean	SD	P value
Age	CSA	9	56.22	5.97	P>0.05
	USA	11	57.36	5.04	
	MI	31	54.93	6.09	
	Total	51	55.68	5.83	
Height	CSA	9	162.89	8.90	P>0.05
	USA	11	159.64	11.17	
	MI	31	160.68	9.73	
	Total	51	160.84	9.77	
Weight	CSA	9	69.67	12.71	P>0.05
	USA	11	63.64	12.04	
	MI	31	63.10	9.54	
	Total	51	64.37	10.75	
BMI	CSA	9	24.89	4.42	P>0.05
	USA	11	23.45	4.03	
	MI	31	23.52	3.02	
	Total	51	23.75	3.48	
Uric Acid	CSA	9	5.07	1.81	P>0.05
	USA	11	4.17	1.89	
	MI	31	4.83	1.30	
	Total	51	4.73	1.54	

Limitations

Our observations were in a small group, and this may not represent the entire population. We did not attempt to find out independent prediction of uric acid on mortality due to short duration of follow-up.

Conclusion

Serum uric levels were similar across all types of acute coronary syndromes. There was no significant correlation between serum uric acid level and hypertension but not diabetes. We did not find significant correlation Killip class and the number of coronary vessels involved.

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Table – 2: Demographic, Electrocardiographic and Angiographic details across Types of acute coronary syndrome.

		CSA (n=9)		USA (n=11)		MI (n=31)		P Value
		N	%	N	%	N	%	
Gender	Female	1	11.1%	4	36.4%	6	19.4%	P>0.05
	Male	8	88.9%	7	63.6%	25	80.6%	
Smoker	No	6	66.7%	7	63.6%	15	48.4%	P>0.05
	Yes	3	33.3%	4	36.4%	16	51.6%	
Obesity	No	8	88.9%	8	80.0%	29	93.5%	P>0.05
	Yes	1	11.1%	2	20.0%	2	6.5%	
Hypertension	No	7	77.8%	6	60.0%	18	58.1%	P>0.05
	Yes	2	22.2%	4	40.0%	13	41.9%	
Diabetes	No	4	44.4%	5	45.5%	21	67.7%	P>0.05
	Yes	5	55.6%	6	54.5%	10	32.3%	
Family History	No	6	66.7%	7	70.0%	20	64.5%	P>0.05
	Yes	3	33.3%	3	30.0%	11	35.5%	
Killip class	1	5	55.6%	8	72.7%	11	35.5%	P>0.05
	2	3	33.3%	1	9.1%	7	22.6%	
	3	0	0.0%	2	18.2%	4	12.9%	
	4	1	11.1%	0	.0%	9	29.0%	
Number of Vessel involved	0	3	33.3%	1	9.1%	0	.0%	P<0.05
	1	2	22.2%	5	45.5%	11	35.5%	
	2	1	11.1%	1	9.1%	8	25.8%	
	3	3	33.3%	4	36.4%	12	38.7%	

Table – 3: Pearson Correlation between serum uric acid and Clinical parameters

Gender	R	0.158	**Hypertension**	R	-.283*
	P	P>0.05		P	P<0.05
	N	51		N	51
Height	R	-0.19	**Diabetes**	R	-0.046
	P	P>0.05		P	P>0.05
	N	51		N	51
Weight	R	-0.144	**Family History**	R	-0.243
	P	P>0.05		P	P<0.05
	N	51		N	51
BMI	R	-0.066	**KILIP**	R	-0.136
	P	P>0.05		P	P>0.05
	N	51		N	51
Smoker	R	0.067	**Number of Vessel involved**	R	0.016
	P	P>0.05		P	P>0.05
	N	51		N	51
Age	R	0.3	**Diagnosis**	R	0.002
	P	P<0.05		P	P>0.05
	N	51		N	51

Table – 4: Serum Uric acid levels in severity of LV dysfunction and Extent of coronary disease.				
	N	**Mean**	**SD**	
Number of coronary vessels involved				
0	4	4.65	3.080	P>0.05
1	18	4.63	1.354	
2	10	5.06	1.645	
3	19	4.67	1.358	
Total	51	4.73	1.540	
Killip Class				
1	24	5.14	1.743	P>0.05
2	11	4.03	.950	
3	6	4.45	1.537	
4	10	4.69	1.410	
Total	51	4.73	1.540	