



A Study on serum uric acids level as prognostic indicator in acute myocardial infarction

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DR. PENDKAR PRITEE G.¹

DR. SHINDE AMOL²

DR. MANOORKAR G.S.³

1 Assistant Professor, GMC, Miraj

2 Assistant Professor, GMC, Nanded

3 Associate Professor, G.S.GMC, Mumbai

Corresponding Author:



Dr. Pritee G. Pendkar
 Assistant Professor
 Dept. of Biochemistry
 Government Medical
 College
 Miraj-416410 (Maharashtra,
 India)

+91

@gmail.com

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Abstract:

Coronary heart disease (CHD) is worldwide health epidemic. Although age-specific events related to CHD have fallen dramatically in last few decades, overall prevalence has risen as population age & patients survive the initial coronary/cardiovascular events. We undertook this study to note level of serum uric acid in acute myocardial infarction (MI). Study was done in Dr. S. C. Govt. Medical College & Hospital, Nanded. Study includes 50 patients of acute MI and other 50 age and sex matched control. Serum uric acid level was estimated by uricase method on day 0, 3, 5 in the above patients. On day of admission mean serum uric acid was 7.3 in acute MI patients & in control it was 5.9. There was a statistically significant higher level of serum uric acid concentration in patients of acute MI on the day of admission as compared to control. Mean serum uric acid on day of admission, 3 day, and 5 day was 7.3, 5.6, and 4.5 respectively. Two patients who died after 3 days of hospital stay had serum uric acid level more 7 mg/dl. Serum uric acid levels are higher in patients with acute MI, it is good predictor of mortality after acute MI. Hyperuricemia is indicator of poor prognosis in acute MI.

Keywords: serum uric acid, acute myocardial infarction, coronary heart disease

Introduction:

Coronary heart disease (CHD) is worldwide health epidemic. Although age-specific events related to CHD have fallen dramatically in last few decades, overall prevalence has risen as population age & patients survive the initial coronary / cardiovascular events.¹

Prevalence of coronary artery disease (CAD) in India increased from 1 % in 1960 to 9.7 % in 1995 in urban population & in rural population it has almost doubled in last decade.²

Previous studies have reported that a high concentration of uric acid is strong marker of

unfavorable prognosis of moderate to severe heart failure & CAD.³

Serum CKMB, Troponin T level is increased in acute myocardial infarction (MI) and has diagnostic & prognostic value. Results from epidemiological studies showed that an increased serum uric acid level is associated with cardiovascular diseases (CVD). We undertook this study to evaluate prognostic value of serum uric acid in acute MI.

Objectives:

-To study the correlation between serum uric acid concentration and acute myocardial infarction.

-To assess the prognostic usefulness of serum uric acid in patients of acute Myocardial infarction.

Materials & Methods:

The present study was conducted at Dr. Shankarrao Chavan Govt. Medical College, Nanded. Study includes 50 patients of acute MI & other 50 age & sex matched control. Serum uric acid level was estimated by uricase method on day 0, 3, 5 in the above patients on auto analyzer XL- 640. The study was approved by ethical committee. After obtaining informed written consent detailed history, examination and investigations were done. Cases are divided into 2 groups according to Killip class.⁴ Group 1 includes Killip class 1 and 2 patients and group 2 includes Killip class 3 and 4 patients.

1. Inclusion criteria:

- Patients more than 18 yrs age with ST segment elevation myocardial infarction (STEMI) / non ST segment elevation (NSTEMI) on the basis of history, clinical examination, ECG changes and biochemical markers were included in study.
- Statistical analysis was done by using student t test. p value <0.05 was taken as statistically significant.

2. Exclusion criteria:

- Patients with condition known to elevate serum uric acid level e.g. CKD, gout, hypothyroidism.
- Patient on drugs with increased serum uric acid e.g. ethambutol, amiloride, vit C.
- Chronic alcoholics were excluded.

Results:

Table 1. Serum uric acid level on day 1

Parameter	Case (N=50)	Control (N=50)	Significance
Serum uric acid day 1	7.17	5.6	< 0.01

The patients with acute MI had statistically significant higher serum uric acid level on day of admission when compared to healthy controls (p<0.01)

Table 2. Shows mean uric acid levels in group 1 and 2 on day 1, 3, 5

Parameter	Group 1 (n = 20)	Group 2 (n = 30)	P value
Serum uric acid on day 1	6.78 ± 1.2	12.67 ± 1.3	< 0.05
Serum uric acid on day 3	6.01 ± 0.8	7.9 ± 0.75	< 0.05
Serum uric acid on day 5	5.07 ± 0.5	5.8 ± 0.6	< 0.05

Mean serum uric acid level was higher in group 2 who belonged to higher Killip class on day of admission, day 3 & day 5 following admission. On follow up, as clinical condition of patients improves the level of serum uric acid decreases.

Discussion:

Our study shows that there was no significant difference as regards to age, sex in patients with acute MI and healthy persons. The patients with acute MI had statistically significant higher serum uric acid level on the day of admission when compared to healthy controls (p < 0.001).

Xanthine oxidase and oxidative stress as reflected by uric acid may form vicious cycle that promote severe heart failure.^{5,6} Failing heart due to AMI may cause tissue hypo perfusion & hypoxia which trigger xanthine oxidase activation and oxidative stress production.^{6,7}

Adenosine synthesized locally by vascular smooth muscle in cardiac tissue is rapidly degraded by endothelium to uric acid which undergoes rapid efflux to vascular lumen due to low intracellular pH and negative membrane potential.⁸

Xanthine oxidase activity⁹ and uric acid synthesis¹⁰ are increased in vivo under ischemic condition and

hence elevated serum uric acid may act as marker of underlying tissue ischemia.

Sarma P et al¹¹ in their study of risk of CAD with raised serum UA reported that in 222 patient who had experienced MI, 68.5% had serum UA >6 mg/dl and 31.5% had normal serum UA.

Kojima S et al¹² in their study conducted in Japan noted that hyperuricemia after acute MI is associated with developing heart failure.

Car S et al¹³ in their study found that higher serum UA determined on admission is associated with higher in hospital mortality and poorer long term survival after acute MI.

Nadkar MY, Jain VI¹⁴ showed that serum UA levels are higher in patients of acute MI correlated with Killip class.

Conclusions:

Serum uric acid levels are higher in patients with acute MI as compared to normal healthy persons. Hyperuricemia is indicator of prognosis in acute MI.

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