



THE PROGNOSTIC ROLE OF SERUM URIC ACID LEVEL IN INDOOR PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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ABSTRACT

Ischemic heart disease (IHD) is the generic designation for a group of pathophysiologically related syndromes resulting from myocardial ischemia- an imbalance between the supply (perfusion) and demand of the heart for oxygenated blood. In more than 90% cases, the cause of myocardial ischemia is obstructive atherosclerosis lesion in the coronary arteries. Some study suggested that uric acid can cause intracellular stress and inflammation leading to endothelial injury and enhancement of vasoconstrictor effect⁵. There are several studies which are conducted overtime to address this issue but there is no any consistent data which suggest the relation of serum uric acid with acute myocardial infarction. Serum uric acid (SUA) levels can be measured in almost all hospitals, especially in developing countries, which have no facilities to measure other more expensive prognostic markers such as high sensitive C - reactive protein, Brain-type Natriuretic Peptide, Interleukin-6 and many others. This simple, easily available, inexpensive laboratory parameter (estimation of serum uric acid) may help in settings where facilities are lacking, can be a useful biomarker to prognosticate patients of acute myocardial infarction

KEYWORDS :

INTRODUCTION

Ischemic heart disease (IHD) is the generic designation for a group of pathophysiologically related syndromes resulting from myocardial ischemia- an imbalance between the supply (perfusion) and demand of the heart for oxygenated blood. In more than 90% cases, the cause of myocardial ischemia is obstructive atherosclerosis lesion in the coronary arteries. Thus IHD is often termed as Coronary Artery Disease (CAD) or Coronary Heart Disease (CHD).¹ The most common cause of myocardial ischemia is atherosclerotic disease of coronary artery (or arteries) that is sufficient to cause a regional reduction in myocardial blood flow and inadequate perfusion of the myocardium supplied by the involved coronary artery. Obesity, insulin resistance, and type 2 diabetes mellitus are increasing and are strong risk factors for IHD. Cardiovascular diseases have been gaining importance in developing countries like India recently because of increased incidence of the disease.

Normal serum uric acid in male 4.0-7.0 mg/dl and in female 3.0-6.0 mg/dl³. The role of uric acid as a risk factor for cardiovascular disease or a prognostic factor is controversial. Uric acid is produced by the enzymatic activity of xanthine oxidase and is the final product of purine metabolism⁴. Xanthine oxidase produces oxidants in this process that may have role in cardio-vascular diseases. Some study suggested that uric acid can cause intracellular stress and inflammation leading to endothelial injury and enhancement of vasoconstrictor effect⁵. Uric acid(2,6,8trioxypurine) is the final excretory product of purine metabolism in humans. Uric acid can serve as important antioxidant by getting itself converted (non-enzymatically) to allantoin. It is believed that the antioxidant role of ascorbic acid in primates is replaced by uric acid ,since these animals have lost the ability to synthesize ascorbic acid. Most animals (other than primates) however, oxidize uric acid by the enzyme uricase to allantoin, where the purine ring is cleaved. Allantoin is then converted to allantoic acid and excreted in some fishes. Further degradation of allantoic acid may occur to produce urea (in amphibians, most fishes and some molluscs) and, later, to

ammonia (in marine invertebrates)² There are several studies which are conducted overtime to address this issue but there is no any consistent data which suggest the relation of serum uric acid with acute myocardial infarction. Therefore this study is designed to evaluate the relation of serum uric acid in Acute MI.

AIM AND OBJECTIVES

To study the relationship between serum uric acid level and prognosis in indoor patients with Acute Myocardial Infarction.

OBJECTIVE:

1. To determine the relationship between serum uric acid level and major cardiovascular events in patients with acute myocardial infarction.
2. To give specific recommendations on the basis of findings of the study.

MATERIAL AND METHOD

• STUDY DESIGN

The present prospective study was conducted in the department of Medicine in Rohilkhand medical college and hospital from period of November 2019 to January 2020

• STUDY GROUP

A total number of 100 patients of Acute Myocardial Infarction admitted in department of Medicine of Rohilkhand medical college and hospital during the study period were taken

• INCLUSION CRITERIA

1. Age \geq 18 years
2. All the patients of Acute Myocardial Infarction admitted within 7 days of presentation during the study period in Rohilkhand medical college and hospital.
3. Both ST segment elevation myocardial infarction (STEMI) and Non-ST segment elevation myocardial infarction (NSTEMI) will be included in the study.

• EXCLUSION CRITERIA

- 1 Any patient with the history of medical illness known to elevate uric acid level, viz
 - a. Gout
 - b. Chronic Renal failure
 - c. Systemic or local infection
 - d. Malignancy
 - e. Repeated Blood Transfusion
 - f. Hematological disorder
 - g. Chronic Alcoholism
2. Patient with history of intake of-
 - a. Hyperuricemic drug (Thiazide, Salicylate, Ethambutol, Pyrazinamide, Allopurinol).
 - b. Impaired renal function (serum creatinine >2mg/dL).
 - c. Had an episode of MI within 3 months.
 - d. Had severe valvular heart disease.

METHODS OF STUDY

The patients admitted in department of medicine in Rohilk hand medical college and hospital with symptoms of Acute Myocardial Infarction were screened with 12 lead ECG & Trop-T and those fulfilling the inclusion and exclusion criteria of our study will be taken as the study subject. The study group selected will be subjected to routine blood investigation, blood sugar fasting & post prandial , fasting lipid profile, serum uric acid, Chest X-Ray, USG abdomen and echocardiography. The demographic information, cardiovascular history and risk factors(smoking, hypertension and diabetes mellitus) of patients were obtained from medical records

RESULTS

Out of 100 patients, 83 (83%) were males and 17 (17%) were females Accounting a ratio of M Male to Female 4.8:1. Patient's age ranged from 26- 80years More than half of patients were between 40-60 years (54%) followed by >60 (32%) and <40 (14%) years.All 100 patients in the study were subjected to 2D ECHO and we observed that 65 patients (65%) had normal left ventricle function and remaining 35 patients (35%) had LV dysfunction ranging from mild to severe. Mild LVD was found among 17% patients and moderate LVD was in 13%. Severe LVD was in 5% patients. When we compared 2D ECHO findings with serum uric acid levels on day 1, we found clinical correlation. Abnormal uric acid was higher among whom abnormal LVF (42.9%) than normal LVF (33.8%). However, the association was statistically insignificant (p>0.05). Also on comparing 2D ECHO in the form of LVEF with outcome of patients mortality was higher among moderate and severe LVD. The association was statistically significant (p=0.02).Study by Chen et al⁶ and Shetty et al⁷ found similar observation when they evaluated LV dysfunction by 2D ECHO and compared with uric acid. Patients with moderate to severe LV dysfunction had high uric acid levels.

When we see the distribution of uric acid, we found that abnormal uric acid was in 37% and 34% at Day 1 and Day 4 respectively. The change in the pattern of uric acid from Day 1 to Day 4 was statistically insignificant (p>0.05).

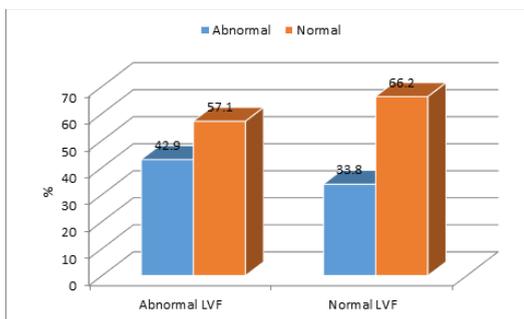


Fig. 1: Correlation of LVEF with Uric acid day 1

Table-1: Correlation of outcome with LVEF

LVEF	No. of patients	Outcome				p-value
		Expired		Discharged		
		No.	%	No.	%	
Normal	65	9	13.8	56	86.2	0.02*
Mild LVD	17	1	5.9	16	94.1	
Moderate LVD	13	6	46.2	7	53.8	
Severe LVD	5	1	20.0	4	80.0	

Chi-square test, *Significant

Table-1 & Fig.1 shows the correlation of LVEF with outcome. Mortality was higher among moderate and severe LVD. The association was statistically significant (p=0.02)

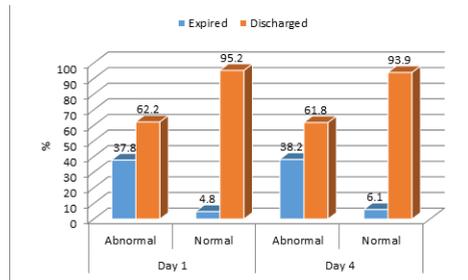


Fig. 2: Correlation of outcome with Uric acid

CONCLUSION

In the present study of 100 patients with acute myocardial infarction we observed significant correlation with various factors.

Based on the findings the conclusion drawn is:

1. In patient's with acute myocardial infarction, patients with hyperuricemia had higher mortality.
2. There was a positive correlation of outcomes with 2D Echo ..
- 3- There was a clinical correlation between hyperuricemia and left ventricle dysfunction which was statistically insignificant.
- 4- Hyperuricemia is an indicator of poor prognosis in acute myocardial infarction.

RECOMMENDATION:

SUA Serum uric acid levels can be measured in almost all hospitals, especially in developing countries, which have no facilities to measure other more expensive prognostic markers such as high sensitive C - reactive protein, Brain-type Natriuretic Peptide, Interleukin-6 and many others. This simple, easily available, inexpensive laboratory parameter (estimation of serum uric acid) may help in settings where facilities are lacking, can be a useful biomarker to prognosticate patients of acute myocardial infarction.

Besides this, controlling hyperuricemia might also be a promising strategy for the prevention of AMI.

We strongly recommend that patients with higher levels of these markers on admission should be closely monitored for AMI associated complications.

To address this issue whether efficacy of serum uric acid level in these patients is significant or not, a detailed study with large sample size may be required. Although of few limitations, we consider that our study make an important contribution, since similar studies especially inconsistent in their result.

LIMITATION OF THE STUDY:

- 1- Major limitations of our study may be the small number of patients.

- 2- Most of our patients in study were male. A large study, especially with more female patients could be more informative.
- 3- Another limitation of the study is that we could not follow up our discharged patients.

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