

## Uric Acid Levels in Patients with Acute Myocardial Infarction

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**Abstract: Background:** Certain coronary risk factors have been convincingly demonstrated while others are still under investigation as is elevated serum uric acid levels. This study aimed to evaluate the relationship between serum uric acid levels in acute myocardial infarction, and short-term adverse effects (heart failure and in-hospital mortality). **Methods:** Forty eight (48) cases of acute myocardial infarction (ST-elevation myocardial infarction STEMI and non ST elevation myocardial infarction NSTEMI). Serum uric acid level was measured on days 0,2 and 6. One week Clinical follow up after admission for heart failure (killip classes with echocardiography finding of LVEF< 45%), and death were defined as the end point of the study. **Results:** In acute myocardial infarction cases there were an increased serum uric acid level with increasing severity of heart failure. This difference was statistically significant ( $P=0.00$ ). Serum uric acid levels were significantly higher in patient who died in hospital as compared to those who were discharged. **Conclusion:** Serum uric acid level is a prognostic marker for short Term acute myocardial infarction-related adverse events (heart failure and in hospital death).

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### 1. Introduction

Many epidemiological studies have suggested that increased serum uric acid is a risk factor for cardiovascular disease.(1-8) Increased serum uric acid levels are linked to obesity, dyslipidemia, and hypertension (metabolic syndrome ),which is associated with increased risk for cardiovascular disease.(9-11) However, the specific role of serum uric acid in acute coronary syndrome remains uncertain.(12-14)

Uric acid is produced by the enzymatic activity of xanthine oxidase and is the final product of purine metabolism. Xanthine oxidase produces oxidants which can cause intracellular stress and inflammation leading to endothelial injury. However, the association of high serum uric acid levels with cardiovascular disease may be due to the role of uric acid as an antioxidant.

It is unclear whether increased levels of serum uric acid in acute myocardial infarction promotes or protects against cardiovascular damage. Is it a risk factor or just a prognostic marker?(15,16)

The aim of this study was to establish the correlation between serum uric acid levels in acute myocardial infarction, and short-term adverse effects ( heart failure and in-hospital mortality).

### 2. Material and Methods

Forty eight (48) cases of acute myocardial infarction ( ST-elevation myocardial infarction STEMI and non ST- elevation myocardial infarction NSTEMI) admitted to coronary care unit, Al-Thoura Central Teaching Hospital, Al-Baida, were included

on the basis of the following criteria : chest pain > 20 minutes, typical ECG changes ( ST- elevation or ST-depression),and rise of serum cardiac enzymes concentration( CK-MB, Troponin).

Subjects with the following conditions were excluded from the study: patient with history of heart failure, renal or liver disease, thyroid dysfunction, active infections, malignancy, receiving drugs(diuretics or steroids), and alcohol consumption.

All patients underwent a standard 12-lead ECG. Brief history and complete clinical examination was carried out, and daily reassessed for signs of heart failure with killip's classification. Blood samples were obtained immediately after admission for analysis of: cardiac enzymes( Troponin, CPK, CK-MB, AST, and LDH),complete blood count, RBS, urea, creatinine, lipid profile, and liver enzymes. Serum uric acid level was measured on days 0,2 and 6.

Clinical follow up 7 days after admission for heart failure (killip classes with echocardiography finding of LVEF< 45%), and death were defined as the end point of the study.

Continuous variables were expressed as mean± standard deviation values. Student t test was used to compare continuous variables, chi square test was used to compare categorical variables. multivariate analysis was performed and  $P$  value less than 0.05 ( $P < 0.05$ ) was taken as significant.

### 3. Results

Table-1 showed that there were no significant difference in age, sex, hypertension, diabetes, dyslipidemia, or urea could be found between the two

groups ( $P > 0.05$ ), with an exception that serum uric acid showed a significant difference.

Table-2 showed the increased serum uric acid level with increasing severity of heart failure. This difference was statistically significant ( $P=0.00$ ).

Serum uric acid levels were significantly higher in patient who died in hospital as compared to those who were discharged, as shown in table-3.

**Table-1 clinical and biochemical data of myocardial infarction cases with and without heart failure**

	Post MI failure n= 7	MI without failure n=41	P value
Cases(men/women) n	5/2	32/9	0.792
Age years	62±6.4	59±8.1	0.841
Hypertension	4	29	0.54
Diabetes	5	31	0.61
Dyslipidemia	2	9	0.501
Smoking	4	28	0.53
LVEF	38±9.8	59±10.2	0.000
Urea	36±6.2	32±4.6	0.78
Serum uric acid	7.8±3.4	5.3±2.03	0.000 *

\*statistically significant

**Table-2 comparison between killip classes and serum uric acid levels**

	Killip I-II	Killip III-IV
Serum uric acid	7.4±1.02	8.2±2.12 *

\*p value < 0.05

**Table-3 comparison between serum uric acid levels in patient who died in hospital and those who were discharged.**

	Died in hospital	Discharged
Serum uric acid	8.52±2.14	6.14±1.66 *

\* p value < 0.05

#### 4. Discussion

Our presented study demonstrated that there was significantly increased serum uric acid in patients with acute myocardial infarction complicated by heart failure, and no significant change in cases of acute myocardial infarction without heart failure. There was a positive correlation between serum uric acid levels with higher killip class. The result was consistent with similar previous findings.(17-19)

Hyperuricemia has been identified in patients with heart failure.(20) serum uric acid has been found to be significantly higher in the coronary sinus than in the aortic root in heart failure, and its level varies inversely with LVEF. This finding implies the association of hyperuricemia with failing heart but Not from diuretics.(21)

Also, our study showed that the patient who died in hospital had a significantly higher serum uric acid values as compared to those who were discharged home.(22)

#### In conclusion:

Increased in admission serum uric acid levels associated with increased short term adverse events .Serum uric acid level is a prognostic marker for short Term acute myocardial infarction-related adverse events (heart failure and in hospital death).

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