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# A study of serum uric acid levels in patients with acute myocardial infarction

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## ABSTRACT

**Purpose:** To study the correlation between serum uric acid concentration in patients of acute myocardial infarction.

**Material and methods:** A study was prospective and observational study. Patient who were admitted in medicine ICU at Krishna institute of medical sciences, Karad. Maharashtra. Patients having acute myocardial infarction (STEMI and/or NSTEMI) were included in this study for a period of 18 months from February 2021 to August 2022. Thus total 100 cases were studied. All data was collected and complied in Microsoft excel. Results of continuous (quantitative data) measurement were presented on Mean +/- SD (min-max) and result on categorical (qualitative data) measurements was presented in percentage and proportions (%).

**Results:** In this study,the majority 56% of patients were in age group of 50 to 70 years. Mean age was 65.74+ 12.3years, ranging from 37 to 85 years.Out of 100 patients, 76% were males and 24% were females. Male to female ratio was 3:1. Most common clinical presentation was chest pain 66%, followed by sweating 54%, 52% had breathlessness, 23% had backpain and 27% had giddiness.Mean cardiac enzymes were CPK MB 20.5 and Serum Troponin I 4.16.According to Killip's classification at day 0, majority cases were in group II 50%, and group III 29% only 7% were in group IV. It was also seen that serum uric acid level was increasing as grade increased. According to Killip's classification at day 3, majority cases were in group II 52%, and group III 31% only 4% were in group IV. According to Killip's classification at day 5, majority cases were in group II 50%, and group III 34% only 2% were in group IV. In present study of 100 patients 89% (89 patients) were discharged and 11% (11 patients) died.Analysis of the mean levels of serum uric acid levels and Killip's class revealed positive statistical significance between serum uric acid levels and Killip's class using student's T test. Analysis of the mean levels of serum uric acid levels and final outcome of subjects at the end of the study revealed positive statistical significance between serum uric acid levels and final outcome of subjects using student's T test. Positive statistical correlation between serum uric acid and Troponin I, CPK MB levels was also seen.

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**Conclusion:** The present study was conducted to find relation between serum uric acid sand acute myocardial infarction. As the levels of uric acid increase the severity of disease also increases. It showed that there was a direct relation between serum uric acid levels and myocardial infarction.

Study also showed that patients with higher Killip class had higher levels of serum uric acid in comparison to patients of lower Killip class. Higher levels of serum uric acid level in association with increasing Killip class is a good predictor of the severity and short-term mortality after myocardial infarction. Mortality was seen in class IV followed by class III and class II of Killip's classification

Thus, patient coming with cardiovascular symptoms and having serum uric acid raised should be taken utmost care so as to avoid further complication related to atherosclerotic cardio vascular diseases. We suggest that serum uric acid can be considered as an additional of investigation which, will be helpful for predicting near future outcome and risk stratification of patients with acute myocardial infarction.

**Keywords:** *Uric Acid, Serum, Myocardial Infarction*

## INTRODUCTION

Coronary artery disease [CAD] is a worldwide health epidemic. [1] Acute myocardial infarction [AMI] is overwhelmingly the most important form of ischemic heart disease [IHD] which seems to be one of main cause in developed and developing countries. Despite spectacular progress in their prevention, detection and treatment over thelast three decades. [2]

Troponin T and I, CPK-MB are all cardiac markers which are released in the blood stream after myocardial infarction.It has been seen that these cardiac markers have a correlation with heart disease like myocardial infarction. Along with theses cardiac markers studies have been conducted to find the association for various other parameters those are related to heart diseases directly or indirectly. One among such parameters is uric acid. Recent review has shown that uric acid acts as a risk factor for heart diseases. It has also been seen that uric acid acts as a prognostic marker in finding the outcome of the underlying heart disease. [3,4]

Studies on uric acid relation to heart disease are very less so its mechanism of action towards the disease is still unknown. Review suggest that raised uric acid level i.e. hyperuricemia is associated with effects on blood, heart and endothelial system. It is seen that raised uric acid level have a negative impact on congestive heart failure and renal dysfunction. [8]

Purines are metabolized by an enzyme named xanthine oxidase finally into uric acid.[9] it is said that the enzyme i.e. Xanthine oxidase produces an oxidants during the process of metabolism that can have role in heart disease. Some review have showed that intracellular stress is caused by uric acid and even cause inflammation which further leads toendothelial injury which ultimately increases the vasoconstrictor effects.[10]

For predicting the prognosis of ST segment elevation myocardial infarction (STEMI), left ventricular dysfunction measurements are used.[1]it was long back in 1967, Killip and Kimball [12] conducted various experiments and found a prognostic classification for STEMI. Killip's classification helped in finding the severity of the disease. This classification is still being used to see the severity of disease and prognosis which helps the treating physician in planning the management of the patients. [13] Even today Killip's classification stands as a powerful indicator in predicting the mortality of cases with myocardial infarction (MI). [14-16]

Very less literature is present as of date on uric acid levels in acute coronary syndrome. Thus, this study was carried out to find the levels of serum uric acid in acute myocardial infarction. Even we used the Killip's Classification to see the severity of disease and correlated the classification with uric acid levels.

We undertook this study to note the levels of serum uric acid in Acute Myocardial Infarction.

### *Aim*

To study the correlation between serum uric acid concentration in patients of acute myocardial infarction.

### *Objectives*

To study the correlation between serum uric acid

and Killip's classification in acute myocardialinfarction.To assess the role of serum uric acid as a marker of short-term mortality in acute myocardial infarction.

## MATERIAL AND METHODS

### *Study design*

This study was prospective and observational study.

### *Study area*

Patient who were admitted in medicine ICU at Krishna institute of medical sciences, Karad. Maharashtra.

### *Study population*

Patients having acute myocardial infarction (STEMI and/or NSTEMI) admitted in ICU of Krishna Institute Of Medical Science were included in this study. A tertiary care teaching institute and research center, Karad, Maharashtra

### *Study duration*

18 months from February 2021 to August 2022. Sample size calculation:

According to a study conducted by Mal Kheraj et al [67] the proportion of hyperuricemia in MI cases was47.89,

So, p = 47.89%

Using formula for sample size (n) calculation,n = $\frac{4 \times p \times q}{e2}$ Where, p = 47.89% = 0.4789q = 1 - p = 0.5211

Taking e, absolute error of 10%, e = 0.1 So, n = $\frac{4 \times 0.4789 \times 0.5211}{0.1 \times 0.1}$

n = 99.82 ≈ 100

So, a total of 100 patients were included in the study.

### *Inclusion criteria*

Patients more than 18 years of age with ST segment elevation myocardial infarction (STEMI) and/or non-ST segment elevation Myocardial infarction (NSTEMI) on the basis of history, clinical Examination, ECG changes and biochemical markers were included in the study.

### *Exclusion criteria*

Uric acid level raised due to medical conditions like chronic kidney disease, gout, hematological malignancy, hypothyroidism, hyperparathyroidism was excluded.

Patients on drugs which increase serum uric acid e.g., salicylates (>2 Gm/day), ethambutol, amiloride, bumetanide, chlorthalidone, cisplatin, cyclophosphamide, cyclosporine, ethacrynic acid, ethambutol, thiazide diuretics, furosemide, indapamide, isotretinoin, ketoconazole, levodopa, metolazone, pentamidine, phencyclidine, pyrazinamide, theophylline, vincristine, vitamin C were excluded.

### *Data collection*

Participants were told about the study and written informed consent was taken.

Study participants admitted under Medicine department and showing the inclusion criteria were studied.

Data was collected by using a pre designed questionnaire which consisted of standard questions related to clinical condition, socio demographic factors, addiction among family members, and so on, were interviewed. In addition, questions related to past and present medical history were also studied. Clinical examination, diagnosis, investigations details of previous operative procedure was done.

Patients diagnosed with acute myocardial infarction (STTEMI and/or NSTEMI) were investigated for blood serum uric acid levels on day of admission.

### *Investigations done*

Hemoglobin, PT INR, Blood sugar level, Blood urea, Serum creatinine, Serum uric acid, Serum CPK MB, Serum Troponin I, Electrocardiogram

### *Statistical analysis*

All data was collected and complied in Microsoft excel. Results of continuous (quantitative data)measurement were presented on Mean +/- SD (min-max) and result on categorical (qualitative data)measurements was presented in percentage and proportions (%). Comparison of qualitative variable was analyzed by chi-square test. Wherever necessary between groups, comparison of

quantitative variables was analyzed by independent student t test according to distribution. A p value of 0.05 was taken as level of significance and was considered statistically significant. Data analysis was done using open epi version 2.3.1. Discussion & Interpretation

The study results were discussed taking into consideration the materials and methods, and results from the other related studies. Conclusions were drawn based on the results of the study.

### *Ethics*

Approval from Institutional Ethical committee was taken prior to start of study.

## RESULTS

In the present study, a total of 100 subjects were included, of them 76 [76%] were males and 24 [24%] were females, predominated by male gender with male to female ratio of 3:1. Of 100 subjects were included in this study, of them 11 subjects were in age group <40 years of them 6 subjects [54.54%] were males and 5 subjects [45.46%] were females. Total 18 subjects were in the age group 41 to 50 years; of them 11 subjects [61.11%] were males and 7 subjects [38.89%] were females. In the age group of 51 to 60 years, of the 31 subjects 23 [74.19%] were males and 8 [25.80%] were females. All the 25 subjects in age group of 61 to 70 years were males. Of the 15 subjects in the age group of more than 70 years 11 subjects [73.33%] were males and 4 subjects [26.67%] were females. The mean age of subjects was 65.74.

| Age in years | Male [n = 76] | Female [n = 24] | Total [n= 100] |
|---|---|---|---|
| <40 | 6 [54.54%] | 5 [45.46%] | 11 |
| 41 to 50 | 11 [61.11%] | 7 [38.89%] | 18 |
| 51 to 60 | 23 [74.19%] | 8 [25.80%] | 31 |
| 61 to 70 | 25 [100%] | 0 | 25 |
| >70 | 11 [73.33%] | 4 [26.67%] | 15 |
| Total | 76 | 24 | 100 |

### *Distribution based on Clinical presentation of respondents*

Of total 100 subjects, 66 [66%] complained of chest pain. Sweating was one of the complains in 54 subjects [54%] of all the subjects included in this study. Of all the subjects, 52 subjects [52%] had breathlessness as one of their complaints. Of the 100 subjects, 27 subjects [27%] complaint of giddiness and 23 subjects [23%] complains of back pain at the time of presentation to the hospital. The most common complaint was chest pain Of total 100 subjects, 35 [35%] had hypertension, 28 subjects [28%] had Type 2 diabetes mellitus and 20 [20%] subjects had both hypertension and type 2 diabetes mellitus.

| Clinical presentation | Frequency | Percent |
|---|---|---|
| Chest pain | 66 | 66 |
| Sweating | 54 | 54 |
| Breathlessness | 52 | 52 |
| Backpain | 23 | 23 |
| Giddiness | 27 | 27 |

In the present study the laboratory examination of patients, the mean BSL was 138.7 milligrams/decilitre (mg/dl), mean HB 11.8 gram/decilitre (gm/dl), mean PT/INR 1.2, mean blood urea 49.5 mg/dl, mean uric acid 7.2 mg/dl and mean creatinine was 1.2 mg/dl.

In present study, subjects had their ECG recorded. It was found that 86 subjects [86%] had ST segment elevation myocardial infarction [STEMI] and 14 subject [14%] had non-ST

elevation myocardial infarction [NSTEMI].

In the present study, 86 subjects had ST segment elevation myocardial infarction [STEMI]. Among these 86 subjects, 35 subjects [40.7%] had lateral wall myocardial infarction [ST elevation in lead I, aVL, V5, V6]. Septal wall myocardial infarction [ST elevation in V1-V4, disappearance of Q wave in V5, V6] was seen in 28 subjects [32.5%]. There were 12 subjects [14%] who had anterior wall myocardial infarction [ST elevation in V1-V6]. Of 86 subjects, 11 subjects [12.8%] had Inferior wall myocardial infarction [ST elevation in lead II, III, aVF].

***Distribution of types of STEMI among the subjects***

| ST segment elevation myocardial infarction | n = 86 | Percent |
|---|---|---|
| Anterior wall MI (ST elevation in V1-V6) | 12 | 14 |
| Septal wall MI (St elevation in V1-V4, disappearance of Q wave in V5,V6) | 28 | 32.5 |
| Lateral wall MI (ST elevation in lead I ,aVL, V5,V6) | 35 | 40.7 |
| Inferior Wall MI (ST elevation in lead II, III, aVF) | 11 | 12.8 |
| Total | 86 | 100 |

***Distribution of Cardiac enzymes level among subjects***

In present study, cardiac enzymes viz. Troponin I and Creatine Phosphokinase- MB [CPK MB] were measured of all the subjects. It was observed that the mean CPK MB levels were 20.5 ng/ml with standard deviation of ± 4.3 and that of Troponin I levels were 5.1 ng/ml with standard deviation of ±1.1.

| Parameter | Mean | Standard Deviation [SD] |
|---|---|---|
| CPK MB [ng/ml] | 20.5 | ± 4.3 |
| Troponin I [ng/ml] | 5.1 | ± 1.1 |

***Distribution according to Killip's classification at day 0 of subjects.***

In present study,100 subjects were classified according to Killip's classification at day0. It was found 11 subjects [11%] belonged to Killip's class 1. Of 100 subjects, majority subjects, 53 subjects [53%] belonged to Killip's class II. Amongst all the subjects, 29 subjects [29%] were classified into Killip's class III. There were 7 subjects [7%] who were classified in Killip's class IV.

| Killip's class | n = 100 | Percent |
|---|---|---|
| I | 11 | 11 |
| II | 53 | 53 |
| III | 29 | 29 |
| IV | 7 | 7 |
| Total | 100 | 100 |

***Distribution according to Killip's classification at day 3 of subjects***

In present study,100 subjects were classified according to Killip's classification at day 3. It was found 12 subjects [12%] belonged to Killip's class 1. Of 100 subjects, 52 subjects [52%] belonged to Killip's class II. Amongst all the subjects, 31 subjects [31%] were classified into Killip's class III. There were 5 subjects [5%] who were classified in Killip's class IV.

| Killip's class | n = 100 | Percent |
|---|---|---|
| I | 12 | 12 |
| II | 52 | 52 |
| III | 31 | 31 |
| IV | 5 | 5 |
| Total | 100 | 100 |

***Distribution according to Killip's classification at day 5 of subjects.***

In present study,100 subjects were classified according to Killip's classification at day 5. It was found 14 subjects [14%] belonged to Killip's class 1. Of 100 subjects, 50 subjects [50%] belonged to Killip's class II. Amongst all the subjects, 34 subjects [34%] were classified into Killip's class III. There were 2 subjects [2%] who were classified in Killip's class IV.

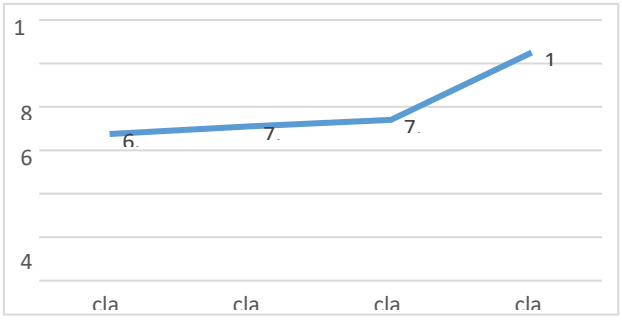
| KILLIP'S class | n = 100 | Percent |
|---|---|---|
| I | 14 | 14 |
| II | 50 | 50 |
| III | 34 | 34 |
| IV | 2 | 2 |
| Total | 100 | 100 |

***Correlation between Killip's classification and serum uric acid***

In present study, Correlation between Killip's classification and serum uric acid was performed. It was noticed that themean serum uric acid of subjects from Killip's class I was 6.75 mg/dl with standard deviation of ± 1.1. On the contrarysubjects from Killip's class IV had mean serum uric acid of 10.5 mg/dl with standard deviation of ± 2.1. Similarly, the mean serum uric acid of subjects from Killip's class II was 7.1 mg/dl with standard deviation of ± 1.3 and those in Killip's class III had a mean serum uric acid of7.4 mg/dl with standard deviation of ± 1.3. Analysis of the mean levels of serum uric acid levels and Killip's class revealed positive statistical significance between serum uric acid levels and Killip's class using student's T test. [The t-value is 5.3. The 'p' is 0.001. The result is significant at p< 0.5]

| Killip's class | Serum uric acid [mg/dl] | | T value | P value |
|---|---|---|---|---|
| | Mean | Standard deviation | | |
| I | 6.75 | ± 1.1 | 5.3 | 0.001 |
| II | 7.1 | ± 1.3 | | |
| III | 7.4 | ± 1.3 | | |
| IV | 10.5 | ± 2.1 | | |

***Correlation between Killip's classification and serum uric acid***

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Distribution of final outcome of subjects at the end of the study

In present study, of 100 subjects, 89 subjects [89%] were discharged and 11subjects [11%] died.

| Outcome | n = 100 | Percent |
|---|---|---|
| Discharged | 89 | 89 |
| Died | 11 | 11 |
| Total | 100 | 100 |

***Prognostic value of Serum uric acid***

In the present study, only 1 subject had uric acid between 4 to 5 mg/dl. Of 100 subjects, 21 subjects had serum uric acid levels in the range of 5.1 to 6 mg/dl, all these patients were discharged. There were 24 subjects with serum uric acid levels in range of 6.1 to 7 mg/dl of which 22 subjects were discharged and 2 subjects died. A total of 54 subjectshad serum uric acid more than 7 mg/dl, of them subjects 45 were discharged and 9 subjects died. It was found that subjects having serum uric acid levels more than that of5.7 mg/dl had more severe course of disease.

| Serum uric acid levels | Discharged | Died |
|---|---|---|
| 4 to 5 mg/dl | 1 | 0 |
| 5.1 to 6 mg/dl | 21 | 0 |
| 6.1 to 7 mg/dl | 22 | 2 |
| >7 mg/dl | 45 | 9 |
| Total | 89 | 11 |

***Serum uric acid and final outcome of subjects at end of the study***

In the present study, correlation between serum uric acid and final outcome was patients was assessed. The mean serum uric acid levels in subjects who were discharged was 7.1 mg/dl with standard deviation of ±1.3. The mean serum uric acid levels in subjects who died was 8.5 mg/dl with standard deviation of ±1.3. Analysis of the mean levelsof serum uric acid levels and final outcome of subjects at the end of the study revealed positive statistical significance between serum uric acid levels and final outcome of subjects using student's T test. [The t-value is 3.3. The 'p'=0.01 The result is significant at p< 0.5]

| Final outcome | Serum uric acid [mg/dl] | | T value | P value |
|---|---|---|---|---|
| | Mean | Standard deviation | | |
| Discharged | 7.1 | ± 1.3 | 3.3 | 0.001 |
| Died | 8.5 | ± 1.3 | | |

***Serum uric acid and final outcome***

| Final outcome | Serum uric acid | | T value | P value |
|---|---|---|---|---|
| | Mean | SD | | |
| Discharged | 7.1 | 1.3 | 3.3 | 0.001* |
| Died | 8.5 | 1.3 | | |

Statistical significance was seen for final outcome and serum uric acid

## DISCUSSION

In present study mean age was 65.74± 12.3years, ranging from 37 to 85 years. Majority 56% were

in age group of 50 to 70 years. Study by Sardar A et al 7 showed that mean age was 52.8+10.7 years. Study by Abhishek Das et al 8 showed that mean age was 64.4 years. Study by Dahiya N et al 9 showed that more than half of patients were between 40-60 years (54%) followed by >60 (32%) and <40 (14%) years.

In present study the most common clinical presentation was chest pain 66%, followed by sweating 54%, 52% had breathlessness, 23% had backpain and 27% had giddiness. Study by Shivakumar BG et al 10 showed that commonest presentation as chest pain 93% and 52% had dyspnoea. Study by Dahiya N et al 9 showed that 89% had chest pain.

In the present study, among patients with STEMI majority 40.7% had Lateral wall MI (ST elevation in lead I ,aVL, V5,V6) and 32.5% had Septal wall MI (St elevation in V1-V4, disappearance of Q wave in V5,V6. Study by Mehrpooya M et al 11 showed that the severity of LV systolic dysfunction was associated with higher level of uric acid. Study by Shivakumar BG et al 10 showed that majority of the patients had inferior wall myocardial infarction (IWMI) (40 %) and most (91 %) of the patients had left ventricular (LV) dysfunction (mild, moderate and severe).

Gosar et al 12 showed that serum uric acid may be useful for prognostication among those with pre-existingAMI. Deep HS et al 13 did a case control study and concluded that patients with hyperuricemia had higher mortality and may be considered as poor prognostic biomarker. Bita O et al 14 showed that acute phase of ST elevation myocardial infarction, uric acid has a prognostic role for in-hospital and short-term (30-day) mortality in men.

In present study, according to Killip's classification at day 0, majority cases were in group II 50%, and group III29% only 7% were in group IV. It was also seen that serum uric acid level was increasing as grade increased. According to Killip's classification at day 3, majority cases were in group II 52%, and group III 31% only 4% were in group

IV. According to Killip's classification at day 5, majority cases were in group II 50%, and group III 34% only 2% were in group IV. Of 100 patients, the final outcome was 89% were discharged and 11% died. Present study showed that patients from grade IV had higher levels of uric acid and had a bad prognosis.

Chowdary RK et al conducted a study on prognostic value of serum uric acid level in patients with acute myocardial infarction and found that two patients who died after three days of hospital stay had a serum uricacid level >7.0 gm/dL and were in Killip class IV. [1]

Nadkar et al [3] did a stusy on serum Uric Acid in Acute Myocardial Infarction and showed that five patients who died after 3 days of hospital stay had serum uric acid level more than 7.0 gm/dL and all of them were Killip class IV. Similar findings were seen in present study. [3]

In a study by Mehrpooya M et al on serum uric acid levels in myocardial infarction and its association with Killip class showed that significant difference among the level of uric acid and Killip classes [P<0.001]. In STEMI patients with higher Killip class, higher level of uric acid was seen. [16]

Similarly, in Shivakumar BG et al study on the importance of serum uric acid levels and Killip classification in predicting prognosis of acute myocardial infarction concluded that more patients with Killip class III and IV hadabnormal uric acid levels as compared to class I, and II. Among 27 patients who expired, 23 were in Killip class III and IV [13 in Killip class III and 10 in class IV] and the mean serum uric acid levels of expired patients wereelevated on all the 3 days with maximum elevation on day 1.

Bombelli M et al studied the prognostic value of serum uric acid: new-onset in and out- of-office hypertension and long-term mortality and found that 342 subjects died, 32 % from cardiovascular causes. Mean serum uric acid [SUA] [5.54 mg/dl] observed in patients who died was higher when compared with those who survived [4.82 mg/dl]; a significant difference in mean serum uric acid [SUA] level was observed between patients who died of cardiovascular causes [5.74 mg/dl] or [4.89 mg/dl]. [61]

Similar results were seen in Abhishek Das et al who studied serum uric acid levels in Acute Myocardial Infarction and showed that Killip's class increased serum uric acid [SUA]also increased and 96% survived and 4% died. [69]

Study by Dahiya N et al was a clinical correlation of role of uric acid in predicting outcome of myocardial infarction and observed that Killip class II, 9 patients [9%] in Killip class III and 10

patients [10%] in Killip class IV. Killip class I was most common[55%] and class III was least common [9%] and uric acid was in 71.4% and 63.6% at Day 1 in KILLIP class III and IV respectively. The association was statistically significant [p=0.001]. [70]

***Association of serum uric acid with outcome***

Serum uric acid was compared among discharged and died patients on day of admission. It was seen that the serum uric acid level was higher among died cases than discharged ones. In the present study, the mean serumuric acid levels in subjects who died was 8.5 mg/dl with standard deviation of ±1.3 and the mean serum uric acid levels in subjects who were discharged was 7.1 mg/dl with standard deviation of ±1.3.

Anil K et al did a study of serum uric acid level in patients of acute myocardial infarction and showed mean serum uric acid [SUA] for discharged patients was 4.67 ±1.95 /dl and it was 7.1 ±1.45 mg/dl for the patients who died in the hospital. SUA levels were significantly higher in the patients who succumbed a s compared to those who were discharged. [2] Similarly, Das A et al showed that patients who were in higher Killip classification and higher uric acid levels, mortality rate is high in them. [15]

***Prognostic value of serum uric acid***

In the present study, only 1 subject had uric acid between 4 to 5 mg/dl. Of 100 subjects, 21 subjects had serumuric acid levels in the range of 5.1 to 6 mg/dl, all these patients were discharged. There were 24 subjects with serum uric acid levels in range of 6.1 to 7 mg/dl of which 22 subjects were discharged and 2 subjects died. A total of 54 subjects had serum uric acid more than 7 mg/dl, of them subjects 45 were discharged and 9 subjectsdied. It was found that subjects having serum uric acid levels more than that of 5.7 mg/dl had more severe course of disease.

Bita O et al studied prognostic role of serum uric acid level in patients with acute ST elevation myocardial infarction and showed that acute phase of ST elevation myocardial infarction, uric acid has a prognostic role for in-hospital and short-term [30-day] mortality in men. [11]

Wei Yu et al observed the efficacy of urate lowering therapy [ULT] in patients with cardiovascular disease, inthe study on Uric Acid and Cardiovascular Disease:

Update from Molecular Mechanism to Clinical Perspective and focused on the latest cellular and molecularfindings of cardiovascular disease associated with hyperuricemia.

[54]. Similarly, in Kuo CF et al study, on significance of serum uric acid levels on the risk of all-cause and cardiovascular mortality, it showed a U-shape relationship between mean serum uric acid [SUA] and both all- cause and cardiovascular mortality was shown, indicating that both low and high SUA levels were prognostically deleterious. [59]

Sardar A et al studied serum uric acid as a prognostic factor of acute myocardial infarction in hospitalized patients and observed a significant association between high serum uric acid level on admission and poor in- hospital outcomes like acute LVF and death in acute myocardial infarction of hospitalized patients. Themeasurement of serum uric acid levels, an easily available, cheap biochemical tool, might be used as a valuable risk marker for detection and prevention of in-hospital outcomes in AMI patients.

## CONCLUSION

The present study was conducted to find relation between serum uric acid sand acute myocardial infarction. As the levels of uric acid increase the severity of disease also increases. It showed that there was a direct relation between serum uric acid levels and myocardial infarction.

Study also showed that patients with higher Killip class had higher levels of serum uric acid in comparison to patients of lower Killip class. Higher levels of serum uric acid level in association with increasing Killip class is a good predictor of the severity and short-term mortality after myocardial infarction. Mortality was seen in class IV followed by class III and class II of Killip's classification

Thus, patient coming with cardiovascular symptoms and having serum uric acid raised should be taken utmost care so as to avoid further complication related to atherosclerotic cardio vascular diseases. We suggest that serum uric acid can be considered as an additional of investigation which, will be helpful for predicting near future outcome and risk stratification of patients with acute myocardial

infarction.

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