

## Original Research

### Assessment of serum uric acid level in patients with myocardial infarction- A clinical study

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#### ABSTRACT:

**Background:** The present study was conducted to assess serum uric acid level in patients with myocardial infarction. **Materials & Methods:** In 80 patients with MI, the concentration of uric acid was measured by a method of uric acid enzyme and enzymatic peroxides. **Results:** There were 60 males and 20 females. Diastolic dysfunction grade I was seen in 16, II in 32, III in 20 and IV in 12 patients. The mean uric acid level in grade I patients was 8.2 mg/dl, in grade II was 7.4 mg/dl, in grade III was 7.2 mg/dl and in grade IV was 7.9 mg/dl. The difference was significant ( $P < 0.05$ ). 42 patients received medicinal therapy, 21 PCI and 17 patients received CABG. The difference was significant ( $P < 0.05$ ). **Conclusion:** Authors found that myocardial infarction patients had higher serum uric acid level and it vary based on diastolic dysfunction grade.

**Key words:** Diastolic dysfunction grade, Myocardial infarction, Uric acid

Received: 12 March, 2020

Accepted: 22 September, 2020

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**This article may be cited as:** Dubey AK, Garg AK. Assessment of serum uric acid level in patients with myocardial infarction- A clinical study. J Adv Med Dent Scie Res 2020;8(11):163-166.

#### INTRODUCTION

Myocardial infarction also known as a heart attack, occurs when blood flow decreases or stops to a part of the heart, causing damage to the heart muscle.<sup>1</sup> The most common symptom is chest pain or discomfort which may travel into the shoulder, arm, back, neck or jaw. Following myocardial infarction (MI) some proteins and enzymes labeled as cardiac markers (CPK, MB/Troponin T & I) are released in to the blood in large quantity from necrotic heart muscle.<sup>2</sup> These markers viz. CPK-MB, Troponin-T, Troponin-I and myoglobin, have specific temporal profile in relation to MI; however, they do not correlate with myocardial function.<sup>3</sup> Epidemiological studies have recently shown that uric acid may be a risk factor for cardiovascular diseases and a negative prognostic marker for mortality

in subjects with pre-existing heart failure. Elevated serum uric acid is highly predictive of mortality in patients with heart failure or coronary artery disease and of cardiovascular events in patients.<sup>4</sup>

Uric acid is a metabolite of purines. Hyperuricemia is generally defined as serum uric acid at least 6 mg/dL in women and at least 7 mg/dL in men. It has been shown that uric acid induces endothelial dysfunction by activating the HMGB1/RAGE signaling Pathway.<sup>5</sup> The researchers identified uric acid as a predictor also an independent risk factor for coronary heart disease. It also used as a biomarker for inflammation.<sup>6</sup>

The present study was conducted to assess serum uric acid level in patients with myocardial infarction.

**MATERIALS & METHODS**

The present study was conducted in the department of general medicine on 80 patients diagnosed with MI. Study was approved from institutional ethical committee. All were informed regarding the study and their consent was obtained.

Data such as name, age, gender etc. was recorded. Blood samples were taken for measurement of

uric acid. In patients with STEMI, Killip classification was used. All subjects underwent two-dimensional echocardiography to determine left ventricular ejection fraction (LVEF) and left ventricular diastolic function. The concentration of uric acid was measured by a method of uric acid enzyme and enzymatic peroxides. Results were statistically analyzed. P value less than 0.05 was considered significant.

**RESULTS**

**Table I Distribution of patients**

Groups	Group I	P value
Males	60	0.04
Females	20	

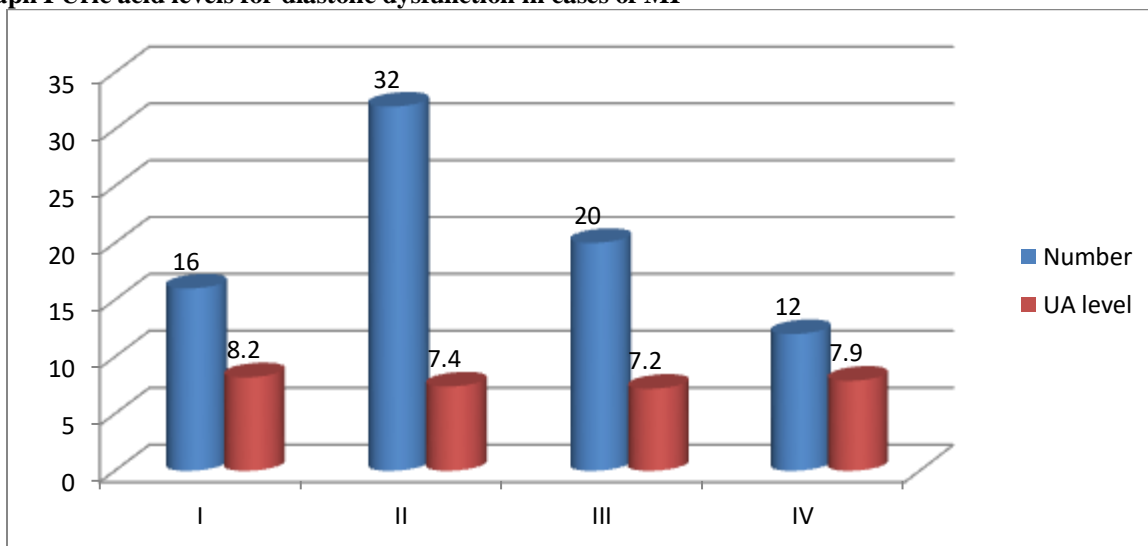
Table I shows that MI patients had 60 males and 20 females.

**Table II Uric acid levels for diastolic dysfunction in cases of MI**

Grade of diastolic dysfunction	Number	UA level	P value
I	16	8.2	0.01
II	32	7.4	
III	20	7.2	
IV	12	7.9	

Table II, graph shows that diastolic dysfunction grade I was seen in 16, II in 32, III in 20 and IV in 12 patients. The mean uric acid level in grade I patients was 8.2 mg/dl, in grade II was 7.4 mg/dl, in grade III was 7.2 mg/dl and in grade IV was 7.9 mg/dl. The difference was significant (P< 0.05).

**Graph I Uric acid levels for diastolic dysfunction in cases of MI**

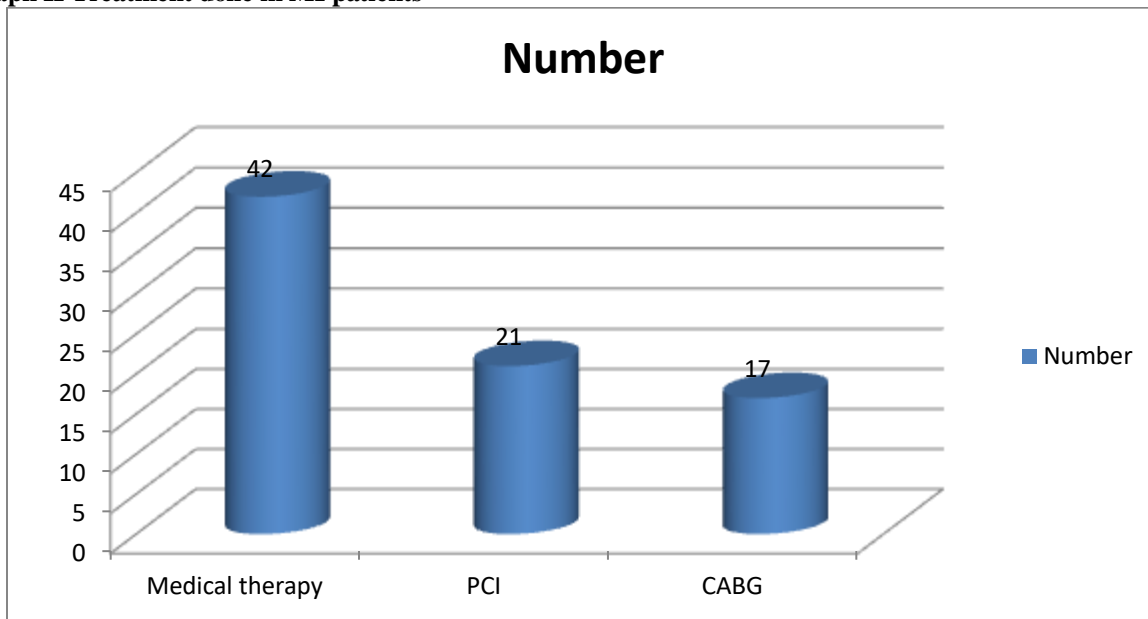


**Table III Treatment done in MI patients**

Treatment	Number	P value
Medical therapy	42	0.01
PCI	21	
CABG	17	

Table III, graph II shows that medicinal therapy was given in 42, PCI in 21 and CABG in 17 patients. The difference was significant (P< 0.05).

**Graph II Treatment done in MI patients**



**DISCUSSION**

During the last few decades, a large number of epidemiological studies have reported an association between serum uric acid (SUA) and cardiovascular disease, especially coronary artery disease (CAD), and literature shows an increasing interest for the direct deleterious impact of the synergistic effect of SUA on other cardiovascular risk factors.<sup>7,8</sup> Uric acid is the final product of nucleic acid metabolism, and its production is controlled by a multitude of different factors, including dietary intake of various foods, renal excretion, and rate of uric acid cell turnover.<sup>9</sup> The present study was conducted to assess serum uric acid level in patients with myocardial infarction.

In present study, MI patients had 60 males and 20 females. We found that diastolic dysfunction grade I was seen in 16, II in 32, III in 20 and IV in 12 patients. The mean uric acid level in grade I patients was 8.2 mg/dl, in grade II was 7.4 mg/dl, in grade III was 7.2 mg/dl and in grade IV was 7.9 mg/dl. Gur et al<sup>10</sup> investigated the association between uric acid level and severity of coronary artery disease. Consecutive 495 patients with coronary artery disease and 356 individuals with normal coronary angiograms were included in the study. Severity of coronary artery disease was evaluated using the Gensini score index. For both groups, conventional risk factors, the levels of uric acid, and other biochemical markers were assessed. The mean uric acid levels of the patient group were significantly higher than those of the control group (P = .002). Mean uric acid levels were higher in men than in women (P < .001). In the coronary artery disease group, there was no significant correlation between uric acid

levels and Gensini score in both sexes. Thus, it can be concluded that uric acid level is associated with the presence but not with the severity of coronary artery disease.

We found that medicinal therapy was given in 42, PCI in 21 and CABG in 17 patients. Omidvar et al<sup>11</sup> evaluated relationship between serum uric acid level and mortality during admission period and 30-day follow up in patients with acute ST elevation myocardial infarction in 184 patients were divided into four groups according to their gender and serum uric acid level on admission day: group A1: males with serum uric acid <7 mg/dl versus group B1: males with serum uric acid >7 mg/dl and group A2: females with serum uric acid <5.6mg/dl versus group B2: females with serum uric acid >5.6 mg/dl. Patients were followed for 30 days after admission. It was seen that in-hospital mortality rate in group B1 was higher than in group A1. Short-term all-cause mortality was significantly higher in group B1 patients. They concluded that in acute phase of ST elevation myocardial infarction, uric acid has a prognostic role for in-hospital and short term (30-day) mortality in male subjects.

Nadkar et al<sup>12</sup> evaluated a close correlation between serum uric acid concentration and Killip classification in patients of acute myocardial infarction in 100 patients with acute myocardial infarction and 50 controls. Serum uric acid level was measured on day 0, 3 & 7 of MI. There was a statistically significant higher level of serum uric acid concentration in patients of MI on day of admission as compared to controls. Patients with history of MI in the past had higher serum uric

acid levels. On all the days serum uric acid levels were higher in patients who were in higher Killip class. All the 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. Serum uric acid levels are higher in patients of acute myocardial infarction correlated with Killip class. Combination of Killip class and serum uric acid level after acute myocardial infarction is a good predictor of mortality after AMI. The limitation of the study is small sample size.

### CONCLUSION

Authors found that myocardial infarction patients had higher serum uric acid level and it vary based on diastolic dysfunction grade.

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