Original Article

Prevalence of High Serum Uric Acid in Patients with Acute Myocardial Infarction in Rajshahi Medical College Hospital

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Abstract

Coronary artery disease is one of the commonest causes of death of our hospitalized patients. It has a number of risk factors such as age, sex, family history, smoking, hypertension, diabetes, dyslipidemia and obesity. Serum uric acid appears to be another risk factor found in several researches. This study was done to find out the prevalence of high serum uric acid in hospitalized acute myocardial infarction patients. This was a descriptive cross-sectional study carried out in department of Cardiology, Rajshahi medical college hospital from January 2015 to December 2016. 115 (one hundred fifteen) AMI patients were included. Baseline characteristics such as age, sex, body mass index, blood pressure, risk factors-hypertension, diabetes mellitus, smoking, family history of IHD, dyslipidemia was recorded. We measured serum uric acid of this patient at admission. Out of 115 patients, 83.5% were male and 16.5% were female. Among risk factors 65.2% had history of hypertension, 20.9% diabetes mellitus, 64.3% smoking, 16.5% family history of IHD and 47.8% dyslipidemia. Out of 115 patients, 35.7% had high serum uric acid and 64.3% had normal serum uric acid. There was no significant difference of confounding variables between high and normal serum uric acid level patients. We found larger number of AMI patients with high serum uric acid. So, high serum uric acid may be a risk factor for acute myocardial infarction.

Key words: Serum uric acid, Acute myocardial infarction, Prevalence.

Introduction

Acute myocardial infarction (AMI) is responsible for more than half million hospitalizations in the United States. The incidence is similar in others developed countries. It is rising at an alarming rate in developing part of the world. The management of patients with AMI is one of the major challenges in the field of cardiology.[1] Coronary artery disease (CAD) is the largest single cause of death in United Kingdom (UK) and many parts of the world. However, over the last decade, the mortality rate in UK has fallen considerably and each year there was approximately 60 deaths per 100000.

Sudden cardiac death is a prominent feature of CAD. One in every six coronary attack was found to present with sudden death as the first, last and only symptoms.[2] Ischemic heart disease (IHD) is becoming a significant burden on health care services in Bangladesh. The average prevalence of

IHD from 3 small scale population-based studies in Bangladesh was 6.56/1000.[3] Hospital admission for IHD is increasing rapidly in our country and the number of young patients having MI has been increasing dramatically.[4] Socioeconomic improvement and changes in lifestyle, increase in tobacco consumption and saturated fat intake, decrease in physical activity, increasing body weight and consequently increasing rate of diabetes mellitus, hypertension and dyslipidemia might have contributed to this increase in our population.[5]

Fang et al[6] and Bos et al[7] respectively proved that elevated serum uric acid is found to be an important risk factor in CVDs. It is also associated with increased death from cardiac causes.[8] Experimental studies have shown that uric acid is linked to endothelial dysfunction,[9] impaired oxidative metabolism,[10] platelet adhesiveness[11] and platelet aggregation.[12]

Uric acid is a new risk factor for AMI as like other factors such as DM, HTN, dyslipidemia, obesity, smoking are responsible for cardiovascular diseases. The true prevalence of high serum uric acid among patients with AMI is not known but may be assumed that it is higher than commonly believed. Many studies were conducted abroad, but a few in our country. So, I have preferred this study, if we can identify high serum uric acid in AMI patients, then proper & effective treatment can reduce morbidity as well as mortality by reducing myocardial infarction related complications.

Materials and Methods

This was a descriptive cross-sectional study carried out in Cardiology Department, Rajshahi Medical College Hospital, Rajshahi. The duration of study was two years from January 2015 to December 2016. A purposive sampling method was done. Acute myocardial infarction patients admitted in Cardiology ward within the study period and who fulfill the inclusion criteria were enrolled. With the consent of concerned authority the data was collected from the respondents according to questionnaire by face to face interview. All patients were admitted within 8 hours of onset of symptoms, acute MI patients was diagnosed by typical chest pain, ECG change and elevated enzyme level. 115 (one hundred fifteen) acute MI patients were included. Blood pressure was measured in lying position after 5 minutes of rest. Measurement of height and weight was done for the calculation of BMI. Patient's blood sample was collected for measurement of fasting uric acid level and also measurement of blood sugar and fasting lipid profile. Normal serum uric acid level <7 mg/dl in men and <6 mg/dl in women. All relevant clinical examination findings and laboratory results were recorded in a case record form.

Results: 115 patients were included in this study

Table-1: Baseline characteristics of study population (n=115)

Baseline characteristics	Frequency (%)	Mean±SD(range)
Age		52.83±10.71 (32-76 yrs)
Sex		
Male	96(83.5%)	
Female	19(16.5%)	
BMI		25.72±1.99 kg/m².
Systolic BP		126.61±21.86 mm of Hg
Diastolic BP		82.07±13.11 mm of Hg
RBS		7.62±2.32 mmol/L
Serum uric acid		6.23±1.84 mg/dl

Mean age of patients was 52.83±10.71 years. Male patients were predominant 96 (83.5%) and female were 19 (16.5%). Mean BMI of patients was 25.72±1.99 kg/m^2. Mean systolic BP was 126.61±21.86 mm of Hg and diastolic BP was 82.07±13.11 mm of Hg. Mean serum uric acid was 6.23±1.84 mg/dl.

Table-2: Distribution of patients by risk factors

Risk factors	No. of patients	% of patients
Hypertension	75	65.2%
DM	24	20.9%
Smoking	74	64.3%
Family history of IHD	19	16.5%
Dyslipidaemia	55	47.8%

Among risk factors 65.2% had history of HTN, 20.9% DM, 64.3% smoking, 16.5% family history of IHD and 47.8% dyslipidaemia.

Table-3: Distribution of patients by serum uric acid level

Serum uric acid level	No. of patients	% of patients
High	41	35.7%
Normal	74	64.3%

The frequency of patients with high serum uric acid level was 41 (35.7%) and normal serum uric acid level was 74 (64.3%).

Table-4: Comparison of confounding variables between high and normal serum uric acid level patients

Confounding variables	AMI patients		p value
	Normal serum uric acid level (n= 74)	High serum uric acid level (n= 41)	
Mean age (years)	52.19 ± 10.05	54.00 ± 11.85	0.388
Hypertension	47 (63.5%)	28 (68.3)	0.606
DM	15 (20.3%)	9 (22.0%)	0.832
Smoking	48 (64.9%)	26 (63.4%)	0.876
Dyslipidaemia	37 (50.0%)	18 (43.9%)	0.531
Family history of IHD	11 (14.9%)	8 (19.5%)	0.520
Mean BMI (kg/m^2)	25.58 ± 1.93	25.97 ± 2.10	0.315

There was no statistically significant difference observed in respect of mean age (df=113, t=-.867, p=0.388), hypertension (df=1, χ^2=0.266, p=0.606), diabetes mellitus (df=1, χ^2=0.045, p=0.832), smoking (df=1, χ^2=0.024, p=0.876), dyslipidaemia (df=1, χ^2=0.393, p=0.531), family history of IHD (df=1, χ^2=0.413, p=0.520) and mean BMI (df=113, t=-1.010, p=0.315) between high and normal serum uric acid level patients.

Discussion: The study population was between 32-76 years. Only 11 (9.6%) patients were below 40 years. Mean age of patients was 52.83±10.71 years. Similar mean age was found by Dharma et al.[13] Higher mean age was observed by Omidvar et al[14] and Timoteo et al.[15] It was found that acute myocardial infarction incidence was higher after the age of 40. Khandakar et al[16] reported that most of the AMI takes place after 40 years of age in Bangladesh.

It was found that the study population was mainly male 96 (83.5%) and female were only 19 (16.5%). Goodarzynejed et al[17] found an association between hyperuricaemia and CAD and a trend for more coronary artery disease in men with hyperuricaemia. Male predominance was also found by Madsen et al[18] and Bickel et al.[19] Female predominance observed by Coutinho et al[20] which was 60%.

In our study mean serum uric acid was 6.23±1.84 mg/dl. It was almost nearer to mean serum uric acid found by Dharma et al[13] and Jularattanaporn et al[21] which were 6.28±1.68 and 6.5±2.2 mg/dl respectively. Omidvar et al[14] and Timoteo et al[15] found mean serum uric acid were 5.74±1.91 and 5.70±1.81 mg/dl.

Our study revealed several risk factors such as hypertension, diabetes mellitus, smoking, dyslipidaemia and family history of IHD. They were 65.2%, 20.9%, 64.3%, 47.8% and 16.5% respectively. Dharma et al[13] found same risk factors such as hypertension, diabetes mellitus, smoking, dyslipidaemia and family history of IHD which were 53%, 21%, 52%, 69% and 24%. Omidver et al[14] also found some risk factors like hypertension, diabetes mellitus, smoking and dyslipidaemia which were 37%, 29.3%, 46.2% and 33.2% respectively. The frequency of high serum uric acid among AMI patients in our study was 35.7%. Almost similar frequency of high serum uric acid among ACS patients was observed by Timoteo et al[15] which was 30.20%. The frequency of high serum uric acid in our study was lower than the prevalence observed by Jularattanaporn et al[21] which was 42.9%. Jularattanaporn et al[21] enrolled only 49 Thai patients with acute coronary syndrome (ACS). Sarma et al[22] found hyperuricaemia (>6mg/dl) in 68.5% of CAD. Lower prevalence of hyperuricaemia was observed by Basar et al[23] and Dharma et al.[13]

Confounding variables like mean age was not significant between high and normal serum uric acid level patients. Similar finding was found by Dharma et al.[13] Significant difference was observed by Bickel et al[19] and Omidver et al.[14]

Confounding variables such as hypertension, diabetes mellitus, smoking, dyslipidaemia and family history of IHD were not significant between high and normal serum uric acid level patients. Similar findings observed by Dharma et al[13] and Abdullah et al.[24] Lim et al[25] found no significant relationship between hypertension and smoking with patients of CAD having high uric acid. Bae et al[26] showed no significant relationship between hypertension, diabetes mellitus, dyslipidaemia with patients of high serum uric acid having CAD.

There was no significant difference of mean BMI between high and normal serum uric acid level patients. Omidvar et al[14] and Abdullah et al[24] found similar finding. Significant association between mean BMI and high uric acid observed by Bickel et al[19] and Timoteo et al.[15] There was no significant difference of confounding variables between high and normal serum uric acid level patients. The frequency of hyperuricaemia in our study was 35.7% which is high compared to other studies and mean serum uric acid was also high. So, hyperuricaemia may be more frequently associated with acute MI.

Conclusion

In our study a larger number of AMI patients with high serum uric acid level were found. This study suggests that high serum uric acid may be a risk factor for acute myocardial infarction. It was found that high serum uric acid in AMI patients is associated with increased risk of complications such as acute LVF, arrhythmia, conduction block, cardiogenic shock etc. A large population based longitudinal study will be needed to establish hyperuricaemia as a risk factor for AMI and its complications.

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