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General Medicine

A CLINICAL STUDY OF SERUM URIC ACID LEVELS IN ACUTE MYOCARDIAL INFARCTION PATIENTS IN GMC, KADAPA

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ABSTRACT **BACKGROUND:** Myocardial Infarction is an important cause of mortality and morbidity in India. Role of Uric acid in development of cardiovascular diseases has been debated over 50 years. Other modifiable risk factors include Diabetes mellitus, Smoking, Hypertension, Hyperlipidemia, Obesity, Stress and Depression. High uric acid level is a novel marker for Coronary Artery Disease. Serum uric acid can be used as a tool to screen the general population for the risk of Myocardial Infarction.

AIM: The aim of this study is to determine the relation between serum uric acid and the risk of Myocardial Infarction.

MATERIALS AND METHODS: This study comprised of 30 patients diagnosed with Acute Myocardial Infarction from May 2019 to December 2019 in the Department of General Medicine in Government medical College, Kadapa. Serum uric acid was measured and patients were evaluated for other Cardiovascular risk factors.

RESULTS: Out of 30 patients,18 patients has abnormal UA, out of which 10 were male and 8 were female. Over all the mean SUA was 7.1mg/dl. Among the males the mean SUA was 7.7mg/dl and in females it was 6.5mg/dl

CONCLUSIONS: This study emphasizes that – serum uric acid has long been recognized as related to increased cardiovascular disease risk and increased UA levels could be used as an index. Patients with abnormal serum UA should be screened for other cardiovascular risk factors and followed up at regular intervals to detect abnormality at earliest for appropriate intervention.

KEYWORDS :

INTRODUCTION

In past two decades, low and middle income countries had a shift of focus from infectious diseases, maternal and child health to Non Communicable Diseases [NCD]. Of the NCDs Cardiovascular disease[CVD] is number one cause of mortality. Coronary artery disease [CAD] is most common and overwhelming cardiac disease. It is the leading cause of death in the industrialized and developing countries like India. Coronary artery disease has rapidly emerged as the major contributor towards the increasing morbidity and mortality.1 Uric acid, an end product of purine metabolism, was first discovered in 1776. The role of serum uric acid in the development of cardiovascular disease has been debated for over 50 years.2 In some studies, uric acid was found to be an independent risk factor for development of cardiovascular and cerebrovascular diseases.3-5 The mechanism by which uric acid may play a pathogenic role in cardiovascular disease is unclear. There is strong and significant association between borderline serum uric acid levels and risk of both coronary heart disease and stroke.6 Hyperuricemia has been associated with elevated circulating endothelin level and one of the major sites for production of uric acid in cardiovascular system is the vessel wall and particularly endothelium. Uric acid may have direct role in atherosclerotic process because atherosclerotic plaque contains more uric acid than control arteries. Hyperuricemia via purine metabolism may also promote thrombus formation.7 The relation between uric acid and cardiovascular disease is observed not only with frank hyperuricemia (defined as more than 5.7mg/dl in women and more than 7 mg/dl in men) but also with uric acid levels considered to be normal but at high range.8 The present study was undertaken to determine whether raised serum uric acid levels are associated with presence of CAD.

METHODS AND MATERIALS

The present study was a Hospital based Observational and Descriptive study conducted in Government Medical College, Kadapa. A total of 30 patients, out of which 18 were male and 12 were female, who were diagnosed with Acute Myocardial Infarction was selected consecutively based on inclusion and exclusion criteria. The period of study was from 1/5/19 to 31/12/19 and the subjects were evaluated for SUA and cardiovascular risk factors.

INCLUSION CRITERIA :

Patient with Angina with ECG changes of Acute MI/ Troponin positive / 2D Echocardiography evidence of RWMA.

EXCLUSION CRITERIA:

Patient with Unstable Angina.

Patients with conditions known to elevate SUA levels-CKD, Gout, Hypothyroidism, Hyperparathyroidism, Hematological Malignancy
Patients taking drugs that increase SUA levels – Salicylates (>2g/d), Ethambutol, Amiloride, Bumetanide, Chlothalidone, Cisplatin, Cyclophosphamide, Cyclosporine, Ethacrynic acid, Thiazides, Furosemide, Indapamide, Isotretinoin, Ketoconazole, Levodopa, Metolazone, Pentamidine, Phencyclidine, Pyrazinamide, Theophylline, Vincristine, Vitamin C, Ethambutol, Probenecid.

Patient who refused to participate in the study.

A purposely built Questionnaire was used to obtain demographic data, habits, relevant family history and other comorbidities like Diabetes and Hypertension. General, Physical Examination, Anthropometric indices, NC, BMI, ECG, Troponin and 2D Echocardiography was done as per standard methods.

Serum uric acid level was measured with uricase method.9
Reference levels - 3.1-7mg/dl – in males
2.5-5.6mg/dl – in females

SUA levels >7mg/dl in males and >5.7mg/dl in females were considered to be abnormal.

Stastical Analysis: The statistical analysis was performed using SPSS 17 software. Mean for the values were calculated. Variables are compared using Chi-square test.

RESULTS

The study group consists of 30 patients with Acute Myocardial Infarction, predominantly male. The mean age of study subjects was 58.36, the mean BMI was 25.16. Out of 30 patients 10 had Diabetes

and 13 patients had Systemic Hypertension. Out of 30 patients,18 patients had abnormal SUA, out of which 10 were male and 8 were female. Overall the mean SUA was 7.1mg/dl. Among the males the mean SUA was 7.7 mg/dl and in females it was 6.5 mg/dl.

Demographic and clinical characteristics of 30 patients with Acute MI:

VARIABLES	Patients with AMI (n=30)
Mean Age	58.36
Gender	18/12 (M/F)
BMI	25.16
SUA	7.1
Hypertension	13
Diabetes	10
Smokers	9
Alcoholics	8

Demographic and clinical characteristics of 30 patients with Acute MI according to the presence of Normal / Increased SUA :

VARIABLES	Normal SUA (n=12)	Increased SUA (n=18)
Mean Age	59	57.9
Gender	8/4	10/8
BMI <18.5 18.5-24.99 25.0-29.99 >30	0 5 4 4	1 8 5 3
Hypertension	7	6
Diabetes	4	6
Smokers	4	5
Alcoholics	4	4

Association of SUA in AMI :

	Normal SUA	Abnormal SUA	Percentage (%)
Males	8	10	55.5
Females	4	8	66.6
Total	12	18	60

DISCUSSION

Despite recent advances in treatment methods, cardiovascular diseases remain as the leading cause of death in all developed countries. The well recognized risk factors like age, sex, smoking, diabetes, hypertension, dyslipidemia explain only a part of this mortality. Hence a search for other risk factors is the need of the hour. Many studies have found conflicting role of uric acid in patients with cardiovascular diseases. This study was conducted to assess the association of serum uric acid level with presence of CAD. The main finding of the study was : (i) the serum uric acid level was higher in patients with CAD. The serum uric acid level was associated with the presence of CAD.

The mean age of cases with CAD was 58.36 years with the range of 33 to 73 years. Majority of the cases (35%) were in the age group of 41-50 years. We observed that the serum uric acid (SUA) levels increased with increasing age. The mean SUA levels were higher among males as compared to females. These observations were statistically significant and correlated with previous studies.10-13. The mean SUA was significantly higher i.e 7.1mg/dl in AMI. Among the males the mean SUA was 7.7 mg/dl and in females it was 6.5 mg/dl.

Several studies have been performed to investigate the relationship between serum uric acid and different aspects of cardiovascular diseases.6,14-16 It is well documented that uric acid is related to risk factors for CAD such as hypertension,17-20 diabetes mellitus,19,20 metabolic syndrome,21 dyslipidemia,16 and obesity.19

In present study, SUA level was significantly high in patients with hypertension, diabetes mellitus, dyslipidemia while there was no significant association with alcohol consumption, tobacco chewing and menopause.

In current study, the mean uric acid level was significantly higher in the group of patients with CAD several studies investigated the relationship between uric acid and the presence of CAD,3-5 In a study, in evaluating the relationship between serum uric acid level and the severity of CAD assessed by the Gensini score, the uric acid level has been reported to be correlated with the presence, but not the severity of CAD.22 Deveci OS et al23 reported in their study that the serum uric acid level was found to be associated with presence and severity of CAD After controlling potential conventional risk factors, only smoking and uric acid were significant predictors for CAD. Furthermore, SUA can be used for assessing severity of CAD.

LIMITATIONS OF THE STUDY:

Sample size was small that cannot be generalized over the whole population. Urban and rural stratification was not done. Diet stratification was not done. It is difficult to prove the causality in observational and descriptive study. So, our study cannot prove the role of uric acid as causal in the patients of CAD but it did clearly prove that SUA is associated with presence of CAD. Further long term prospective studies are needed to establish the role of SUA in CAD. Also, trial of SUA lowering drugs in ischemic heart disease patients as well as in those at increased risk of CAD can be worth considering.

CONCLUSION:

The serum uric acid level was higher in patients with CAD. A strong association has been found between serum uric acid level and the presence of CAD. In addition to the evaluation of conventional risk factors in daily clinical practice, the measurement of uric acid level might provide significant prognostic benefits in terms of global cardiovascular risk assessment and management of patients

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