Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 9[11] October 2020 : 35-38

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.876
Universal Impact Factor 0.9804
NAAS Rating 4.95

ORIGINAL ARTICLE **OPEN ACCESS**

Association of Elevated Uric acid concentration with Critical Coronary Diseases

Babur Ikram[1*], Tariq Shahzad Chachar[1],Farmanullah[2], Muhammad Tahir[3], Hidayat Ullah[4],Samiya Tasleem[4], Muhammad Asif[5], Mehtab Alam[6], Fozia Anwar[7]

[1]Senior Resident Invasive Cardiology-Mohammed Bin Khalifa Bin SulmanAlkhalifa Cardiac Centre Bahrain.
[2]Department of Medical Lab Technology Abasyn University Peshawar.
[3]Department of Biochemistry, Hazara University, Mansehra, KP, Pakistan.
[4]Department of Advanced Institute of Medical Science Dalian Medical University China.
[4]Department of Microbiology, FUUAST-Karachi University Karachi.
[5]Department of Pharmaceutics, Faculty of Pharmacy, University of Karachi.
[6]Department of Biochemistry Azad Jammu & Azad Kashmir Medical College Muzaffarabad.
[7]Health Informatics Department COMSATS University Islamabad.
Corresponding Author's Email: baburikram@gmail.com.

ABSTRACT

Uric acid end product of the purine metabolism in human body, associated with different risk factor of the critical coronary artery diseases like hypertension, diabetic etc. which also intensify the coronary artery disease, one of the most prevalent with high morbidity and mortality rate disease. Current study focus to elevate the association between the hyperuricemia and critical coronary artery diseases. For this,after obtaining the oral consent,cross sectional study was carried out among 400 individuals, dividing into two groups one suffering from the cardiovascular diseases (200 individuals) and one the control group which don't suffer from the cardiovascular disorder (200 individuals). Further demographic character like gender age and relevant medical history were recorded in the questioner. These groups were elevated for the presence of the hyperuricemia. Findings were statistically analyzed by using odd ratio. Result reveled that most of the respondent were with age 45-55 years (n=210). Number of male (61.50%) respondents were higher as compared to female (38.50%). Total n=159 (39.75%) were found with hyperuricemia in which 105 (66.03%) were with critical coronary artery disease while n=54 (33.96%) were without disease. Besides this n=241 (60.25%) subjects were without hyperuricemia in which most of the respondent were in control group n=146 (60.58%). Odd ratio between these two groups were 2.07 [95% CI 1.23 to 3.48) P = 0.006). This association was still existing after stratification of the subjects into age, gender, smoking, hypertension, diabetics, dyslipidemia, family history of coronary artery diseases and BMI, current study concluded that there is positive association between hyperuricemia and critical coronary artery diseases.

***Key words**: Coronary artery disease, hyperuricemia, coronary artery diseases, risk factors*

Received 21.08.2020 Revised 21.09.2020 Accepted 18.10.2020

INTRODUCTION

Uric acid the waste product formed as the end product of the purine metabolism (breakdown) in body which was previously linked to gout due to the reason that 18% of the patients with the hyperuricemia (elevated uric acid level) develop gouts [1] but now it has been associated with several other diseases [2,3,4]. For instance, insulin resistance, hypertension, dyslipidemias and several cardiovascular disorders [5,6,7,8]. Coronary artery disorders were formally linked to wealthy, developed and industrialized society due to consumption of high calories food and sedentary life style but now it has been travel from developed countries to developing countries including Pakistan [9]. Besides this disorders Pakistan have double burden of diseases e.g. infectious and non-infectious. [10].

Association of the hyperuricemia with severity of CAD is still contradictory because people of our country has lead a different life style in terms of dietary habits and other life style like physical activity. If any perfect evidence has found, then patient can be identified on early basis and can be treated for

hyperuricemia as well as for its critical CAD situation which can slow down the developing of the further cardiovascular diseases. This will provide benefit to both patients in their diseases and health care providers to define guidelines for better diagnosis and management. Current study aimed to evaluate possible role of the uric acid in cardiovascular diseases.

MATERIAL AND METHODS

*Inclusion:*A random cross sectional study was carried out in general population of Kohat city KP Pakistan. Dividing the subjects into two groups. First group with critical Coronary artery disorders (presented for Coronary artery disorderson angiography) while second group act as control group without Coronary artery disorders Each group contain 200 individuals (total 400) from both genders.

Exclusion: all those patients were excluded from the study who have heart failure or on any high dose drug treatment like on drugs against tuberculosis, diuretics drugs, and using multivitamins, drugs for lowering level of uric acid, alcoholic persons and those with chronic renal failure.

Blood sampling and hematology: after obtaining the oral consent, disinfectant was applied and blood samples were collected from the subjects for analysis of the uric acid concentration. Analysis of the blood was carried out with the standard chemical analyzer in the Pathology Laboratory of the KDA hospital Kohat. All those samples which have uric acid more than 6.4mg/dl were labeled as high SUA level. Besides this, patients with un-stable angina, ST-elevation myocardial infraction and non-ST elevation myocardial infraction were further subjected to coronary angiography to assess for the presence of any disorder (CAD).

Statistical analysis: Findings are statistically analyzed with the SPSS version 18. For the association between hyperuricemia and CAD odd ratio was calculated. Further outcomes were categorized for gender, age, smoking, hypertension, family history of IHD, diabetes and any raised for Body Mass Index (BMI). After categorization OR (odd ratio) was estimated with 95% confidence interval.

RESULTS

Majority of our subjects were in age group of 45-55 years old and most (61.5%) of them were male. Besides this, among 400 subjects 39.75% were diagnosed with hyperuricemia. In which 26.25% were with chronic CAD. Apart from this n=190/400 patient were also suffer from hypertension among which 20% were with hyperuricemia condition and 14.20% were with CAD. 123/400 patient were diabetic among which 56.91% were with elevated uric acid and 36.6% were with CAD. Majority of our subjects (n=288) were suffered with abnormal lipid content (Dyslipidemia) among which 30.90% were with hyperuricemia and 24.30% were with CAD. Further detail is given in the table 2 and percentages is illustrated in figure 1 below. While odd relationship of hyperuricemia and critical CAD is given in the table 1.

Table 1: Odd Ratio between hyperuricemia and coronary artery diseases

	Hyperuricemia		Total
	Positive	Negative	
Cases with CAD	105 (66.03%)	95 (39.41%)	200
Control group	54 (33.96%)	146 (60.58%)	200
Total	159 (39.75)	241 (60.25%)	
Odd ratio 2.07 [95% CI 1.23 to 3.48) P = 0.006)			

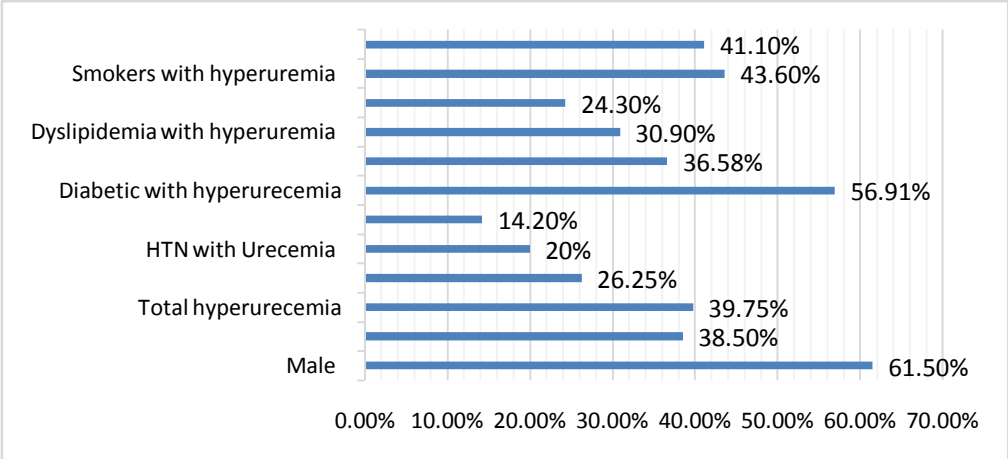

Figure 1: Occurrence of the hyperuricemia and CAD in total number of subjects

Table 2:Stratification of results for different risk factors of cardiovascular diseases

Stratification category	Total frequency	Hyperuricemia frequency	Hyperuricemia with CAD	OR
Age groups				
<35 years	35	12	2	5.4
35-45 years	100	48	22	1.37
45-55 years	210	78	68	1.39
>55 years	55	21	13	1.24
Gender				
Females	154	44	21	1.38
Males	246	115	84	2.56
Medical History				
HTN	190	38	27	1.48
Non-HTN	210	121	78	2.98
diabetic	123	70	45	1.65
Non-diabetic	277	89	60	2.15
Normal-lipid profile	112	48	35	1.23
Dyslipidemia	288	89	70	2.35
Non- smokers	242	90	40	2.65
Smokers	158	69	65	1.56
Family history of CAD				
Positive	210	100	102	2.31
Negative	190	59	3	1.35
Body Mass Index (BMI)				
raised	235	106	80	1.98
normal	165	53	25	2.98

DISCUSSION

Different studies have been carried out to assess the association of the uric acid in the cardiovascular disorders. Like Framingham heart study and ARIC study conclude that there is no association between uric acid and cardiovascular diseases and study conducted in the Itlay that show that there is no association between hyperuricemia and cardiovascular disorders [11] but different other studies have been carried out and shows that uric acid has been linked with the cardiovascular diseases [12]. One study carried out in Japan has concluded that availability of the uric acid in blood can cause CAD even in small fraction that is 1.0mg\dl in serum (SUA) than a group that don't have any change in the SUA level (p=0.042) [13].

Gensini score one of the best indicator known to evaluate the severity of the CAD [14]. In one study concluded that mean Gensini score was different significantly (p<0.006) among groups (high uric acid and normal uric acid). Another study concludedthat chronic lesions were more frequently occur in the group with elevated uric acid than a group with normal uric acid level [15]. Several other studies also conclude strong association between elevated uric acid and heart disorders [16-19]. Uric acid level in the serum don't increase directly the risk of the heart disorders but show direct impact on some risk factor like hypertension which in turn increase the chance of the cardio-vascular disease [17]. It is not necessary all the time that elevated uric acid will show some symptoms sometimes it is asymptomatic which should not be considered as biological inert because it may cause or intensify the coronary artery disease [18]. Our current study is comparable to these all mentioned studies because it also shows positive association between SUA and CAD and can be considered as valuable evidence. Hyperuricemia can be considered as independent risk factor critical coronary artery diseases [20].

Though our study can be considered as valuable work (as evidence in the association between hyperuricemia and critical CAD but with limitation as it is totally an observational studies and we only considered change in the level of the uric acid but this may happen with the course of time.

CONCLUSION

Current studies concluded that hyperuricemia is higher in the group suffering from critical coronary artery disease as compared to the group which is not suffering from the CAD and hence it can be considered that association between the hyperuricemia and critical coronary artery disease is positive.

REFERENCES

1. Qiu L, Cheng X, Wu J, Liu J, Xu T, Ding H.(2013). Prevalence of hyperuricemia and its related risk factors in healthy adults from Northern and Northeastern Chinese provinces. BMC Public Health;13:664-8

2. Chen JH, Chuang SY, Chen HJ, Yeh WT, Pan WH. (2009). Serum uric acid level as an independent risk factor for all_cause, cardiovascular, and ischemic stroke mortality: A Chinese cohort study. Arthritis Rheum; 61(2):225-32.
3. SinanDeveci O, Kabakci G, Okutucu S, Tulumen E, Aksoy H, Baris Kaya E, et al. (2010). The association between serum uric acid level and coronary artery disease. Int J ClinPract; 64(7):900-7.
4. Stark K, Reinhard W, Grassl M, Erdmann J, Schunkert H, Illig T, et al. (2009). Common polymorphisms influencing serum uric acid levels contribute to susceptibility to gout, but not to coronary artery disease. PLoS One 2009;4(11):e7729.
5. Causevic A, Semiz S, MacicDzankovic A, Cico B, Dujic T, Malenica M, et al. (2010). Relevance of uric acid in progression of type 2 diabetes mellitus. Bosn J Basic Med Sci, 10(1):54–9.
6. Hwu CM, Lin KH. (2010). Uric acid and the development of hypertension. Med SciMonit, 16(10):RA224–RA30.
7. Gagliardi AC, Miname MH, Santos RD. (2009). Uric acid: a marker of increased cardiovascular risk. Atherosclerosis , 202 (1):11–7.
8. Borges RL, Ribeiro AB, Zanella MT, Batista MC. (2010). Uric acid as a factor in the metabolic syndrome. CurrHypertens Rep;12(2):113–9.
9. Aje TO, Miller M. Cardiovascular disease: a global problem extending into the developing world. World J Cardiol 2009;1(1):3-10.
10. Bhalli MA, Aamir M, Mustafa G. (2011). Metabolic syndrome in acute coronary syndrome. Pak Armed Forces Med J ;61(2):173-7.
11. De Luca G, Secco GG, Santagostino M, Venegoni L, Iorio S, Cassetti E, et al. (2012). Uric acid does not affect the prevalence and extent of coronary artery disease. Results from a prospective study. Nutr Metab Cardiovasc Dis ;22(5):426-33.
12. Goodarzynejad H, Anvari MS, Boroumand MA, Karimi A, Abbasi SH, Davoodi G. (2010). Hyperuricemia and the presence and severity of coronary artery disease. Laboratory Medicine;41(1):40-5.
13. Okura T, Higaki J, Kurata M, Irita J, Miyoshi K-i, Yamazaki T, et al. (2009). Elevated serum uric acid is an independent predictor for cardiovascular events in patients with severe coronary artery stenosis: subanalysis of the Japanese Coronary Artery Disease (JCAD) Study. Circulation;73(5):885-91.
14. Gensini score indicator to evaluate the severity of the CAD Available at: https://www.approach.org/pdfs/tutorials /History_of_Coronary_Scoring_March2014.pdf
15. Qureshi AE, Hameed S, Noeman A. (2013). Relationship of serum uric acid level and angiographic severity of coronary artery disease in male patients with acute coronary syndrome. Pak J Med Sci 29(5):1137-41.
16. Fang J, Alderman M H.(2000). Serum uric acid and cardiovascular mortality the NHANES I epidemiologic follow-up study, 1971–1992. National Health and Nutrition Examination Survey. JAMA; 283:2404-10.
17. Kuwabra M. (2015). Hyperuricemia, cardiovascular disease and hypertension. Pulse ;3(1) 242-52.
18. Wu AH, Gladden JD, Ahmed M, Ahmed A, Filippatos G. (2015). Relation of serum uric acid to cardiovascular disease. Int J Cardiol;213(1):4-7.
19. Biscaglia S, Ceconi C, Malagu M, Pavasini R, Ferrari R. (2015). Uric acid and coronary artery disease: An elusive link deserving further attention. Int J Cardiol, 213 (1):28-32
20. Li M, Hu X, Fan Y, Li K, Zhang X, Hou W, et al. (2016). Hyperuricemia and the risk for coronary heart disease morbidity and mortality a systematic review and dose-response meta-analysis. Sci Rep;6(1):1-11

CITATION OF THIS ARTICLE

B Ikram, T S Chachar, Farmanullah, M Tahir, H Ullah, S Tasleem, M Asif, M Alam, F Anwar. Association of Elevated Uric acid concentration with Critical Coronary Diseases. Bull. Env. Pharmacol. Life Sci., Vol 9[11] October 2020 : 35-38