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Research Article

**ASSOCIATION BETWEEN LEVELS OF SERUM URIC ACID
AND SEVERITY OF HEART FAILURE****Dr. Zain-ul-Harman, Dr. Syed Ammad Saeed, Dr Tariq Mehmood
BVH Bahawalpur****Article Received:** November 2019 **Accepted:** December 2019 **Published:** January 2020**Abstract:**

Objective: There is an increase in the level of serum uric acid in clinical condition of hypoxemia. The rationale of this research work was to determine the association between severity of congestive heart failure (CHF) and levels of serum uric acid.

Methodology: In this research work, we analyzed total two hundred and eighty five patients with diagnosis of CHF who got admission in Mayo Hospital, Lahore from April 2019 to September 2019. The range of the age of the patients was 17 to 67 years. We used the NYHA (New York Health Association) scoring to access the CFH severity. We considered the level of serum uric acid of greater than 7 mg/dl as high.

Results: We analyzed total 285 patients suffering from congestive heart failure. The average age of the patients of this research work was 54.0 ± 2.80 years. There were 65.960% male and 34.030% female patients in this research work. Forty percent patients were present in Class-2 of NYHA, 32.630% patients were in Class-3 and 25.610% patients were in Class-4 and 1.750% patients were in Class-1. Total 59.290% patients fulfilled the hyperuricemia's definition. Among them 83.430% were male and 16.570% were female patients. Majority of the patients present with Hyperuricemia (62.130%) were present in the age group from 51 to 60 years, with an average age of 57.0 ± 4.50 years. We discovered a significant association between the BNP and level of serum uric acid ($P < 0.0010$), and usage of diuretics ($P < 0.0010$). Total 34.930 CHF patients present with hyperuricemia were in NYHA Class-3 & NYHA Class-4 whose serum uric acid was more than 8.0 mg/dl in comparison with the 31.570% CHF patients with hyperuricemia whose serum uric acid was lower than 8.0 mg/dl.

Conclusion: We observed the high level of serum uric acid in 59.290% patients suffering from CHF. This finding showed that level of serum uric acid can provide prognostic data in populations. This marker of serum uric acid can be measured easily with low expense to diagnose the patients with high risk of congestive heart failure.

Keywords: Congestive heart failure, hyperuricemia, comparison, average, significant, association, NYHA, uric acid.

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INTRODUCTION:

Kidney excreted the uric acid which is the final product of breakdown of kidneys. To most important enzymes which are accountable for the breakdown of uric acid are XO (Xanthine Oxidase) and XDD (Xanthine Dehydrogenase). These enzymes are also responsible for the generation of radical free from oxygen which results into oxidative stress. Additionally, oxidative stress in combination with disproportion of nitric oxide could exaggerate the inflammatory pathways causing further rise in the production of the cytokine [1]. The range of the normal level of serum uric acid is from 2.40 to 7.40 mg/dL in male while the range is from 1.40 to 5.80 mg/dL in females [2]. CHF is the cause of high rate of morbidity as well as mortality in whole world. This is also the cause of high costs of health care facilities. Epidemiological research works have discovered a relationship between enhanced level of serum uric acid to an increase rate of vascular event and rate of mortality among patients present with HTN (Hypertension), DM (Diabetes Mellitus) and prior cardiovascular complications [3, 4].

There is diagnosis of higher than 550000 new patients of failure of heart every year in only USA [5]. The failure of heart which is very common issue in normal public with increase costs in health care fields and high rate of mortality, influences about two percent young population of the developed countries [6]. Enhanced levels of serum uric acid are also very common in CHF. There is lot of attention towards association between cardiovascular diseases and the levels of serum uric acid in current years [7]. The level of serum uric acid can be a vital marker for the diagnosis of the patients present with already existing heart complications [8]. There are very few research studies to evaluate the enhanced levels of serum uric acid as independent risk factor for failure of heart in public. This very research work carried out to determine the association between severities of failure of heart with the levels of serum uric acid.

METHODOLOGY:

This research work included total two hundred and eighty five patients who got admission in Department of Cardiology of Mayo Hospital, Lahore from April 2019 to September 2019. The range of the age of the patients was seventeen to sixty seven years. The patients suffering from other serious diseases were not the part of this research work. Trained cardiologists diagnosed the failure of heart in accordance with the current guidelines [9]. We explained the advantages and objective of this research work to all the patients of this research work and we took written consent from all the participants of this research work. We collected the data about the disease history as well as all the patients underwent complete examination. We assessed the severity of the CHF with the utilization of the NYHA classification.

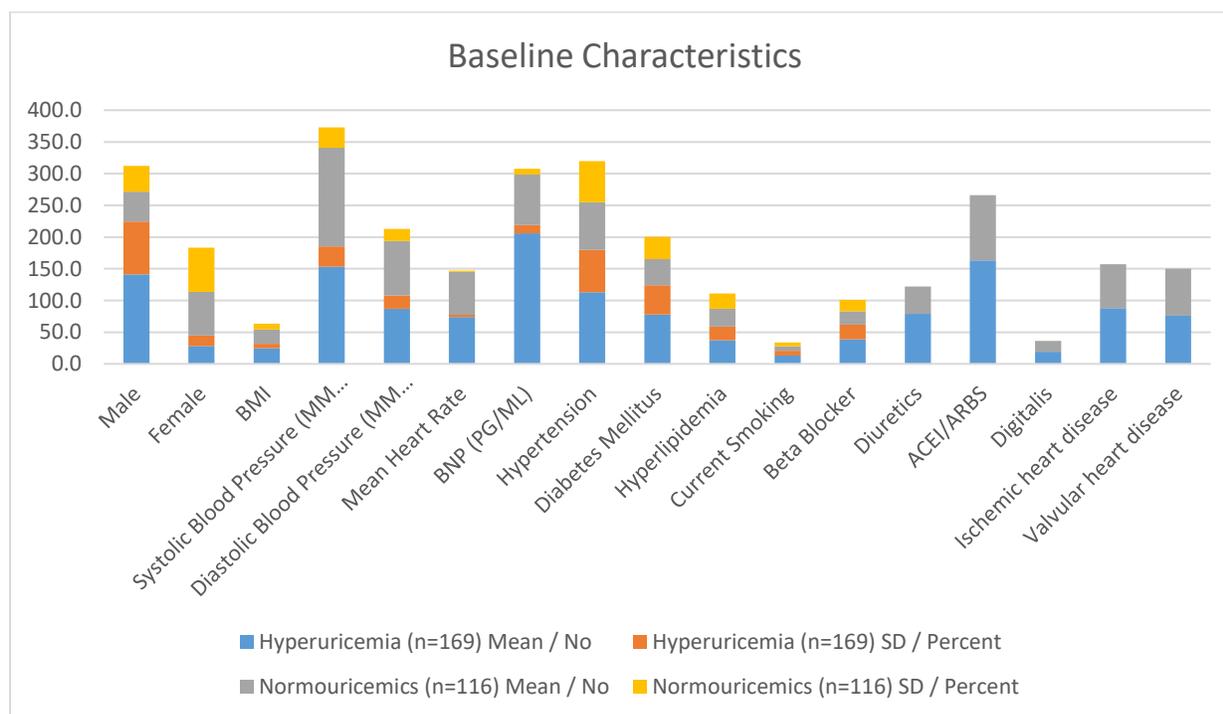
The measurement of the level of serum uric acid carried out after half day fasting with the use of enzymatic procedures with the help of chemical analyzer. We defined the hyperuricemia as a level of serum uric acid > 7 mg/dl. We took the 5 cc blood from every patient and sent those sample to the laboratory of the hospital on that very day. We measured the level of serum uric acid under complete supervision of skilled pathologist. We gathered all the information on separate well organized Performa for each patient. SPSS V. 23 was in use for the statistical analysis of the collected information. We calculated the averages and standard deviations for various continuous variables like age of the patients and levels of serum uric acid we expressed the categorical variables in percentages. P value of less than 0.050 considered as significant.

RESULTS:

In this research work, we evaluated total two hundred and eighty five patients suffering from CFH with a range of age from 17 to 67 years with an average age of 54.0 ± 2.80 years. There were total 65.960% (n: 188) male and 34.030% (n: 97) female patients. Total 59.290% (n: 169) met complete hyperuricemia's definition. Table-1 displays the baseline traits of the patients suffering from congestive heart failure.

Table-I: Showing baseline characteristics n=285.

Variables		Hyperuricemia (n=169)		Normouricemics (n=116)		P-value
		Mean / No	SD / Percent	Mean / No	SD / Percent	
Clinical & baseline characteristics	Male	141.0	83.43	47.0	40.51	-
	Female	28.0	16.56	69.0	69.48	-
	BMI	24.6	7.00	22.9	9.00	0.1680
	Systolic Blood Pressure (MM HG)	153.0	32.00	156.0	32.00	-
	Diastolic Blood Pressure (MM HG)	87.0	21.00	86.0	19.00	-
	Mean Heart Rate	73.9	3.60	67.5	2.00	0.2390
	BNP (PG/ML)	206.0	13.00	79.8	9.00	<0.001
Risk factors	Hypertension	113.0	66.86	75.0	64.65	-
	Diabetes Mellitus	78.0	46.15	41.0	35.34	0.0640
	Hyperlipidemia	37.0	21.89	28.0	24.13	0.0860
	Current Smoking	13.0	7.69	7.0	6.03	0.9320
Drugs	Beta Blocker	39.0	23.07	21.0	18.10	-
	Diuretics	79.0	-	43.0	-	<0.001
	ACEI/ARBS	163.0	-	103.0	-	0.6430
	Digitalis	19.0	-	17.0	-	0.0510
Etiology	Ischemic heart disease	88.0	-	69.0	-	-
	Valvar heart disease	76.0	-	74.0	-	0.9760



Among total two hundred and eighty five patients suffering from CFH, seventeen patients were in the age group of less than eighteen year of age, 35 patients in the age group of 18 to 40 years, fifty eight patients in the age group of 41 to 50 years whereas one hundred and forty six patients were in the age group 51 to 60 years and twenty nine patients were present in the age group of greater than sixty years of age.

Table-II: Serum uric acid levels and severity of congestive heart failure: n=285.

SUA (MG/DL)	NYHAI	NYHAII	NYHAIII	NYHAIV	Total
n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
<6	3.0 (1.050%)	40.0 (14.030%)	27.0 (9.470%)	5.0 (1.750%)	75.0 (26.310%)
6 to 8	1.0 (0.350%)	37.0 (12.980%)	28.0 (9.820%)	24.0 (8.420%)	90.0 (31.570%)
8.1 - 12	1.0 (0.350%)	36.0 (12.630%)	30.0 (10.520%)	30.0 (10.520%)	97.0 (34.930%)
>12	0(0%)	1.0 (0.350%)	8.0 (2.800%)	14.0 (4.910%)	23.0 (8.070%)
Total	5.0 (1.750%)	114.0 (40.0%)	93.0 (32.630%)	73.0 (25.610%)	285.0 (100.0%)

DISCUSSION:

We stated in this research work that 59.290% patients were present with high levels of serum uric acid. There are many reports about the high levels of serum uric acid in the patients of heart failure. This research work also reported the possibility of the levels of serum uric acid as maker of cardiovascular complications [10]. Various research work have stated that hyperuricemia shows a high risk of mortality in the patients present with heart failure. In one current research work, high level of uric acid increased the all causes mortality among patients suffering from chronic or acute heart failure [11]. The high levels of serum uric acid was present with association with long-term poor outcomes in such patients of heart failure [12]. Different research works have displayed an association between enhanced levels of serum uric acid in heart failure and high rate of morbidity as well as mortality [11, 13, 14]. The increased levels of uric acid enhances the severity of the heart failure as prescribed in NYHA classification [15].

The level of serum uric acid has displayed to have inverse relation with the magnitude of maximal intake of oxygen and functional capacity [16]. In the patients present with heart failure, the concentration of serum uric acid have association with the high superoxide dismutase activity and vasodilatation of dependent on endothelium [17]. Asymptomatic hyperuricemia is an inflammatory state having affiliation with the increased levels of inflammation of serum markers, count of neutrophil and CRP (C-reactive protein) [18]. The data in the present field is not consistent whether a reduction in the level of serum uric acid will result in clinical advantage to those patients present with the confirmed heart failure [19]. Some works debate that enhanced levels of serum uric acid occurring as an outcome of use of diuretic may play an advantageous role [20].

CONCLUSION:

We found the high level of serum uric acid in 59.290% patients with congestive heart failure. The level of serum uric acid can distinguish the without any symptom of CHF. The decreasing of the level of serum uric acid can be the modern approach to reduce the risk and treatment of heart failure.

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