

Frequency and Relation of Hyperuricemia with Congestive Heart Failure

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ABSTRACT

Aim: To determine the frequency and relation of hyperuricemia with congestive heart failure.

Methodology: This was a cross sectional descriptive study that was done in Department of cardiology Hayatabad Medical Complex Peshawar after approval from the hospital ethical committee. The duration of study was 6 months.

Results: Total 145 patients with Congestive Heart Failure were studied. Out of these 145 patients, 87 patients were males and 58 patients were females. Among these 145 CHF patients, 93 patients were found to be hyperuricemia. Out of these 93 hyperuricemia patients, 77 patients were males and 16 patients were females. Among these 93 hyperuricemia patients, 38 patients were in NYHA Class II, 25 patients were in NYHA Class III and 30 patients were in NYHA Class IV.

Conclusion: Congestive Heart Failure (CHF) was associated with high serum uric acid (SUA) levels. Hyperuricemia was more common in males as compared to females. Serum uric acid (SUA) levels were also directly related to the clinical severity of CHF.

Keywords: Congestive Heart Failure (CHF), Hyperuricemia, New York Health Association (NYHA).

INTRODUCTION

Congestive heart failure is the condition in which pumping capacity of the heart is insufficient to meet the body requirements causing stasis of blood and congestion in the lungs and dependant areas of the body. CHF affects about 2% of the western population and is the most common aetiology of hospital admission in ages >65 years.¹

The diagnosis of CHF is mainly based on history and physical examination with tests like x-ray chest, ECG, and echocardiography. With therapy, these patients have impaired life which affects every part of life e.g., physical, psychological and economical aspects^{2,3}.

Different biomarkers have been involved as risk factors and prognostic factors of CHF. An important one of these is serum uric acid which may rise due to increased purine metabolism and this can be of prognostic value in congestive heart failure. Serum uric acid is also seen in diabetes, hypertension, renal failure, metabolic syndromes and several other cardiovascular diseases in many studies⁴. Other researchers suggested the independent role of hyperuricemia on increased mortality, cardiovascular disease (CVD) and renal disease in the general population⁵. Serum uric acid levels play important prognostic role in cardiovascular diseases⁶.

METHODOLOGY

This descriptive study was conducted in Cardiology Department of Hayatabad Medical Complex, Peshawar after approval from the hospital ethical committee.

Sample size: It was 145, keeping 60% frequency of hyperuricemia in chronic heart failure patients, 95% confidence interval and 5% margin of error using WHO sample size calculations. Non probability consecutive

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sampling was done. Patients of 18 to 60 years of age and both genders, presenting with CHF were included. All patients were subjected to detailed history and examination. CHF severity was assessed using New York Health Association (NYHA) classification. Diagnosis of CHF was made clinically by raised JVP, peripheral edema, hepatomegaly, bilateral basal crepts, S3 gallop and echocardiographic findings of heart failure like low ejection fraction and fractional shortening. Serum uric acid cut off was 7.2mg/dl for males and post menopausal females and 6mg/dl for premenopausal females. Patients with possible secondary hyperuricemia like drugs causing hyperuricemia, malignancies, acute or chronic kidney disease patients were excluded from the study. Data collected was entered in SPSS 16. Mean±SD was calculated for continuous variable like age and serum uric acid levels and categorical variable like gender was expressed as frequencies and percentages. Chi square test was applied with P value < 0.05 as significant value.

RESULTS

The detail of results are given in tables 1-4.

Table 1: CHF patients with respect to hyperuricemia and gender

Sex	Hyperuricemics		Normouricemics		Total
	N	%age	N	%age	
Male	77	53.1	10	6.9	87(60%)
Female	16	11.03	42	28.9	58(40%)
Total	93	64.1	52	35.9	145(100%)

P value 0.002

Table 2: CHF patients with respect to age

Age (Yrs)	n	%age
18 – 40	7	4.9
41 – 50	41	28.2
51 – 60	97	66.9
Total	145	100

Mean age was 57 years with SD±2.73.

Table 3: Hyperuricemia with respect to age

Age (Yrs)	n=	Hyperuricemic Subjects	Total
18 – 40	3	3.22	2.07
41 – 50	21	22.58	14.48
51 – 60	69	74.19	47.58
Total	93	100	64.14

Table 4: Serum Uric Acid Levels And Severity Of CHF

SUA(mg/dl)	NYHA II	NYHA III	NYHA IV	Total
<6	40(27.6%)	10(6.9%)	2(1.4%)	52(35.9%)
6 – 8	30(20.7%)	12(8.3%)	6(4.1%)	48(33.1%)
8.1 – 12	8(5.5%)	11(7.6%)	14(9.7%)	33(22.8%)
>12	0	2(1.4%)	10(6.9%)	12(8.3%)
Total	78(53.8%)	35(24.1%)	32(22.1%)	145(100%)

Mean serum uric acid (SUA) levels are 7.73 mg/dl with SD \pm 2.

DISCUSSION

In our study, SUA was significantly higher among symptomatic CHF patients than in asymptomatic patients since 25.5% of the hyperuricemic CHF patients were in NYHA III and NYHA IV whose serum uric acid was above 8 mg/dl as compared to 12.4% hyperuricemic CHF patients whose SUA was below 8 mg/dl. This fact may help to identify asymptomatic patients in follow-up. Our study also showed that uric acid levels increased significantly with NYHA class. In other studies, it showed that rise in serum uric acid levels influence both systolic and diastolic functions of the heart. Though results from this study can guide us to the possibility of uric acid lowering treatments as one of management plan for CHF. Results from LIFE study in heart failure patients using losartan which has uricosuric property are in favor of this, but on the contrary diuretic which cause hyperuricemia are beneficial and used in CHF treatment^{12,13}.

Previous studies showed that uric acid is oxidative stress marker. Patients of chronic heart failure with hyperuricemia have a greater activity of superoxide dismutase which is one of the important enzymes involved in free radical injury⁸. In one study, it is seen that hyperuricemia is an independent risk factor for cardiovascular diseases and CHF⁹. Anker et al. demonstrated the independent effect of hyperuricemia on the mortality and morbidity due to CHF while one of Framingham heart study on 6763 patients showed it to be dependent on other well established risk factors of CHF¹⁰. In another study, hyperuricemia was also related to exercise tolerance and NYHA class of CHF¹¹.

In another study, it is seen that exercise tolerance and maximal oxygen consumption during exercise tolerance test are inversely related to serum uric acid indicating that serum uric acid levels are directly related to the severity of CHF⁹.

CONCLUSION

- Serum uric acid is related to circulating markers of inflammation in patients with CHF. This study showed that serum uric acid is one of the important risk factor of chronic heart failure.
- The rising levels of serum uric acid are directly related to the severity of heart failure as predicted by NYHA class.
- Treatments guided to lower the serum uric acid levels for prevention of heart failure and slowing the progression of established heart failure can be successful for future studies.

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