



A STUDY ON SERUM URIC ACID AS A PROGNOSTIC MARKER IN HEART FAILURE

General Medicine

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ABSTRACT

Background And Objective: Heart failure is a problematic disease in both developed and developing countries worldwide with more than 20 million people affected each year. In developed countries the prevalence is 2%. Recently our understanding of heart failure has evolved to be more complex involving neuroendocrine and immune system activation. Now we had understood that not only the cardiovascular system is affected here, but peripheral tissues and other organs also contribute to symptoms and play a role in the pathogenesis and progression of the disease. Numerous studies show increasing evidence of role of uric acid as a marker of metabolic and haemodynamic derangements in heart failure patients. Uric acid can also be used as a predictor of survival in these patients. **Methodology:** A total of 100 patients with ejection fraction <55% were included in the study. Significant differences between serum uric acid in different subgroups was observed and role of uric acid as a prognostic marker was evaluated. Results: Hyperuricemia was observed in 38% of heart failure patients with EF <55%. It was observed that NYHA class III and IV patients had increased uric acid levels. There was significant negative correlation between low ejection fraction and uric acid. Hyperuricemia was associated with increased mortality rates. **Conclusion:** The results clearly establish the role of serum uric acid levels as a prognostic marker in heart failure patients. uric acid levels are ready for clinical use, either as a prognostic marker or diagnostic marker to find out the morbidity, complications and subsequent mortality in heart failure patients with EF<55% and specifically for NYHA III and IV heart failure with EF <40% the therapeutic intervention with uric acid reducers, xanthine oxidase inhibitors for the above ailment.

KEYWORDS

Heart failure, Uric acid, Prognosis, Ejection fraction.

INTRODUCTION

Heart failure is a problematic disease in both developed and developing countries worldwide with more than 20 million people affected each year. In developed countries the prevalence is 2%. The prevalence rises with age, with 6-10% of people affected over the age of 65 years. Women contribute to 50% of patients, this can be due to long life expectancy. Overall prevalence is increasing, this can be contributed in part by new advanced therapies for cardiac disorders, coronary heart disease, rheumatic heart disease and arrhythmias that allows a longer survival. Heart failure patients are classified into heart failure with preserved ejection fraction and heart failure with reduced ejection fraction. Recently our understanding of heart failure has evolved to be more complex involving neuroendocrine and immune system activation. Now we had understood that not only the cardiovascular system is affected here, but peripheral tissues and other organs also contribute to symptoms and play a role in the pathogenesis and progression of the disease. Numerous studies show increasing evidence of role of uric acid as a marker of metabolic and hemodynamic derangements in heart failure patients. Uric acid can also be used as a predictor of survival in these patients.

AIMS AND OBJECTIVE:

- 1) To estimate the level of uric acid in heart failure patients and the prognostic importance of uric acid to be assessed.
- 2) To identify the importance of uric acid as a prognostic marker in heart failure.

METHODOLOGY:

This is a prospective study with a sample size of 100 patients visiting opd and in the wards of department of medicine in narayana medical college and hospital, Nellore with duration of study 18 months.

Inclusion Criteria

Patients above the age of 18 years with ejection fraction less than 55%.

Exclusion Criteria

Patients with Gout, Acute and Chronic renal failure, Prior history of malignancy, Pregnant and lactating women.

Study Design

This study is done in 100 patients with heart failure. A detail history, clinical examination and ECHO evaluation was done for all patients.

Investigations sent were Serum uric acid, Blood urea, serum creatinine and Blood sugar.

Statistical Analysis

All the collected data were statistically analysed using appropriate statistical test. P value less than 0.01 were considered significant.

OBSERVATIONS AND RESULTS

Table No 1 : Distribution According To Age.

AGE (IN YEARS)	NO OF PATIENTS	PERCENTAGE
<40	12	12%
41-50	31	31%
51-60	24	24%
61-70	22	22%
>70	11	11%

Table No 2: Sex Distribution

SEX	NO OF PATIENTS	PERCENTAGE
MALE	70	70%
FEMALE	30	30%

70% percent of study population were composed of males and 30% were females.

Table No 3: Distribution Of Patients Based On NYHA Class

NYHA CLASS	NO OF PATIENTS	PERCENTAGE
I	7	7%
II	30	30%
III	37	37%
IV	26	26%

Table No 4: Ejection Fraction

EJECTION FRACTION	NO OF PATIENTS	PERCENTAGE
<40%	38	38%
>40%	62	62%

38% of patients had an ejection fraction that is <40%.

Table No 5: Serum URIC ACID

SERUM URIC ACID	NO OF PATIENTS	PERCENTAGE
HIGH(>6.8)	38	38%
ABSENT (<6.8)	62	62%

38% of patients had high uric acid levels and 62 had less than 6.8mg/dl

Table No 6: Serum Uric ACID And Age

AGE(IN YEARS)	SERUM URIC ACID	
	HIGH	LOW
<40	2	10
41-50	15	16
51-60	13	11
61-70	18	4
>70	9	2
P VALUE - 0.002		
SIGNIFICANT		
KRUSKAL WALLIS TEST		

This table shows the correlation of levels of uric acid and age. There is a significant correlation between increasing age and uric acid

Table No 7: Mean Serum Uric ACID Vs NYHA Class

NYHA	SERUM URIC ACID	
	MEAN	S.D
I	6.21	1.2
II	6.52	1.3
III	7.38	1.6
IV	7.55	1.7
P VALUE - 0.042		
SIGNIFICANT		
ANOVA		

This table shows mean uric acid levels were significantly high in NYHA class III and IV.

Table no 8: Ejection Fraction And URIC Acid

EJECTION FRACTION	SERUM URIC ACID	
	HIGH	LOW
< 40%	42	19
> 40%	15	24
P VALUE - 0.003		
ODDS RATIO - 3.53		
SIGNIFICANT		
CHI SQUARE TEST		

This table shows that there is statistically significant negative correlation between ejection fraction and uric acid levels.

Table No 9: Prognosis Versus NYHA Class

NYHA CLASS	PROGNOSIS	
	DEAD	ALIVE
ONE	0	7
TWO	0	30
THREE	3	34
FOUR	13	13
P VALUE - 0.001		
SIGNIFICANT		
KRUSKAL WALLIS TEST		

This table shows that mortality was high in NYHA class III and IV

Table No 10: Prognosis Versus Serum Uric ACID
PROGNOSIS VERSUS SERUM URIC ACID

SERUM URIC ACID	PROGNOSIS	
	DEAD	ALIVE
> 6.8	13	44
< 6.8	3	40

P VALUE - 0.03
ODDS RATIO - 4.75
SIGNIFICANT
CHI SQUARE TEST

Table no 11: Mean Serum Uric ACID Versus Prognosis

PROGNOSIS	MEAN URIC ACID	
	MEAN	SD
DEAD	8.21	1.32
ALIVE	7.02	1.61
P VALUE - 0.034		
SIGNIFICANT		
UNPAIRED T TEST		

DISCUSSION

In this study, patients with heart failure with EF <55% were taken and the association between uric acid and clinical symptoms, signs was analysed and observed over a period of one year. The role of hyperuricemia in the outcome of heart failure patients was also assessed. The association of serum uric acid and the development of heart failure in population of patients with stable coronary heart disease was found to be significant. In this study it was found that there was a significant correlation between age and uric acid with a p value of 0.002 which was statistically significant. With increase in age of patients the level of uric acid in serum was found to be increased.

On the other hand, a significant negative correlation was present between ejection fraction and serum uric acid levels. In this study hyperuricemia (uric acid level >6.8 mg/dl) was found in 38% of patients and uric acid level <6.8mg/dl was found in 62% of patients. Serum uric acid levels and sex of the individuals revealed no significance.

In this study patients were categorized in to four groups based on New York Heart Association Classification (NYHA). Study exposed that there was significantly high serum uric acid levels in NYHA class III and IV patients. The mean serum uric acid in NYHA Class III and IV patients was 7.38 mg/dl and 7.55 mg/dl. In this study 38% of the individuals had an ejection fraction of <40%. The low ejection fraction had significant negative correlation with high uric acid levels. In patients with hyperuricemia the prognosis was worse with rise in mortality rates. The mean uric acid level in patients who died was 8.21mg/dl as compared to 7.02 mg/dl in patients who survived. The P value was 0.034 and was significant.

CONCLUSION

In this study hyperuricemia was observed in 38% of heart failure patients with EF < 55%. It was observed that NYHA class III and IV patients had increased uric acid levels. There was significant negative correlation between low ejection fraction and uric acid. Hyperuricemia was associated with high mortality rate. This clearly establishes the role of serum uric acid levels as a prognostic marker in heart failure patients. This particular study is a single centric prospective study done in a limited number of patients to validate the already available study reports saying uric acid can be used as a prognostic marker in heart failure.

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