Association between serum uric acid level and congestive heart failure: Analysis of the NHANES 2017 – 2020

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Background

- Recent studies have shown that serum uric acid (SUA) is associated with increased cardiovascular events, whether the association between a wide range of serum uric acid levels and congestive heart failure remains unclear.

Methods

- We examined a cross-sectional study from the National Health and Nutrition Examination Survey (NHANES) 2017-2020 that included participants ≥18 years old. The classified SUA into four quartile and history of CHF informed by a doctor or other health professional was examined by multiple logistic regression.

Results

- We identified 9,473 patients with SUA results
  - Mean ± SD age was 45+/-20 years old, and 51.0% were female.
  - White accounts for 34.8%, followed by Black (25.1%), Mexican American (12.7%), Asian (11.7%), Hispanic (10.3%), and others (5.5%).
- Among patients with SUA results, up to 293 participants (3.7%) had congestive heart failure.
- Participants were classified into four quartiles based on their SUA results. The average SUA respected of each quartile(Q) was 3.65, 4.81, 5.72, and 7.30 mg/dL, respectively **(Figure 1)**

Table 1. Multiple Logistic regression for the association between serum uric acid level and risk of congestive heart failure (CHF)

	Univariate analysis		Multivariate analysis*	
SUA	**OR**	**95% CI**	**OR**	**95% CI**
Q1	**Reference**		**Reference**	
Q2	1.50	0.97, 2.31	1.06	0.65, 1.72
Q3	1.86	1.23, 2.83	1.13	0.70, 1.82
Q4	4.14	2.85, 6.02	1.92	1.23, 2.99

* Adjusted for age, gender, race, BMI, smoking status, high systolic blood pressure (<130 vs.>130 mmHg), diabetic status, and UPCR

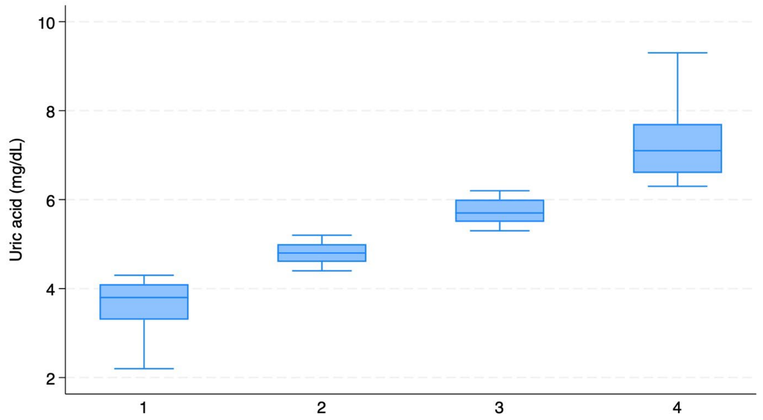

Figure 1. Distribution of Serum Uric Acid (SUA) from serum uric acid quartiles

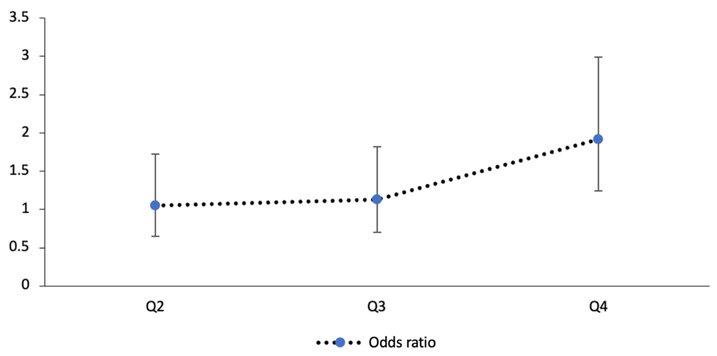

Figure 2. Graded association between serum uric acid level and prevalence of CHF

Results (continuation)

- The risk of CHF among individuals with Q3 and Q4 SUA were 1.86 and 4.14 times more likely to occur, when compared to individuals with Q1 SUA respectively, while the risk of CHF among patient with Q2 SUA was 1.50 times as likely to have CHF compared to Q1 SUA but not statistically significant.
- After adjusting for age, gender, race, BMI (>25 vs. <25 kg/m2), smoking status, high systolic blood pressure, diabetic status, and urine albumin creatinine ratio, only participants with Q4 SUA were 1.92 times as likely to have CHF compared to those with Q1 SUA; However, among participants with Q2 and Q3 SUA, the risk of CHF was 1.06 and 1.13 times respectively but not statistically significant **(Table 1 and Figure 2)**

Conclusion

- Our findings suggest that serum uric acid may be a potential risk factor for CHF in the general population.
- Further research is needed to understand better the underlying mechanisms between serum uric acid and congestive heart failure.

Acknowledgment

- Centers for Disease Control and Prevention (CDC). National Center for Health Statistics. National Health and Nutrition Examination Survey Data. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention for the NHANES data.

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