

RESEARCH ARTICLE

Association of Serum Renal Function Levels with Heart Failure Disease in Iraqi Patients

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ABSTRACT:

Renal function tests are commonly used in clinical practice to look for renal disease, the most common includes the serum urea, uric acid and creatinine. Heart failure patients have a higher incidence of renal function test abnormalities than individuals who do not have heart failure disease. Fifty subjects of adults (male) were divided in to two groups, 25 subjects (healthy) as control (group1) and 25 subjects with heart failure (group 2). Our results indicate that serum uric acid, urea, and creatinine values were significantly elevated ($P \leq 0.05$) in patients group (2) compared with healthy group (1). The results also showed, the effect of age categories on uric acid blood urea nitrogen and creatinine values ($P \leq 0.05$) and there were no significant differences between age (41-60) years and (61-80) years. This study also shows a strong correlation between serum uric acid, urea and creatinine values ($P \leq 0.05$) in heart failure patients. **Conclusion:** It concluded from the above finding that there was effect of heart failure disease on renal function levels.

KEYWORDS: Renal function tests, heart failure disease, renal dysfunction.

INTRODUCTION:

Heart failure (HF), occasionally called congestive cardiac failure, is a state in which the cardiac muscle is weakened and can't pump as well as, it usually does the interaction between the kidney and the heart, also called the cardio renal syndrome¹. Kidney disturbance is a common sequelae for patients with heart failure, but its connection with clinical outcomes has not been fully characterized^{2,3}. The physiological relation between chronic kidney disease and heart failure because renal impairment helps to heart failure by elevated volume expansion and salt retention, up regulation of neuro-hormonal pathways, pro inflammatory mechanisms and likely other mechanisms⁴. Renal disturbance in Heart failure was determined more by passive congestion than by low perfusion⁵. Patients over 75years, Cardiac failure incidence overall is 1% increasing to 12%, these patients often suffer from severity disease including diabetes mellitus, chronic obstructive pulmonary disease and ischemia heart disease⁶.

In heart failure cohorts, the range of chronic renal disorders between 30-60% and is related with elevated severity disease and death rate^{7,8}.

Several studies have reported on associated between the fat of patients with various kinds of clinical cardiovascular disease and the declined of renal function⁹. Also heart failure is a complicated cardiovascular states with complex pathophysiology, poor fate and quickly developing treatment that require persistent essential and clinical search¹⁰. HF itself is related with development of chronic kidney disease (CKD) and high risk of renal disturbance¹¹. This means that the start of chronic kidney disease is a risk factor for the subsequent development of heart failure¹². Over 80% of cardiac failure patients are age ≥ 65 years, some of the famous causes of cardiac failure are diabetes, high blood pressure, chronic renal disease and coronary artery disease¹³. Glomerular filtration rate was associated highly with left ventricular function well before any diagnosis of cardiac failure or kidney failure has been done^{14,15}. BUN/creatinine ratio and blood urea nitrogen on admission have been registered to be related with cardiovascular death rate in heart failure patients¹⁶.

MATERIALS AND METHODS:

This study was done in Ibn-Al-Nafees teaching hospital/ laboratory department. Fifty male subjects were divided into two groups:

Group1: 25 subjects (healthy group) as control their age 37 - 60 years.

Group 2: 25 patients of heart failure the age 50 – 80 years.

Three milliliters venous blood were obtained by using disposable plastic syringe. The collected samples were centrifuged at 2000-3000rpm for at least 10 min to get serum samples. The separated serum samples were analyzed for renal function tests (urea, uric acid and creatinine). Serum uric acid was determined by enzymatic assay and serum urea was done by urease hypochlorite method. Creatinine test was determined by using alkaline picrate method (chemical method).

STATISTICAL ANALYSIS:

Results were analyzed by using statistical analysis program to study the relationship between heart failure and renal function levels. Least significant differences – LSD test was used to compare among the value of the parameters in this study¹⁷.

RESULTS:

In Table (1) shows, the patients were significantly differences ($P \leq 0.05$) higher in uric acid, urea and creatinine comparison with control (healthy subjects). The mean value of urea reached to 62.54 ± 1.29 mg/dl in patients compared with control 27.28 ± 0.87 mg/dl and the mean values of uric acid and creatinine were (7.61 ± 0.36 , 2.224 ± 0.31)mg/dl respectively in heart failure patients compared with control group 4.145 ± 0.31 mg/dl and 0.748 ± 0.04 mg/dl respectively.

Table (1):Effect of heart failure disease on kidney function levels.

Parameters	Mean \pm standard Error (Mean + SE)		
Groups	Urea (mg/dl)	Uric acid (mg/ dl)	Creatinine (mg / dl)
Control	B 27.28 ± 0.87	B 4.145 ± 0.31	B 0.748 ± 0.04
Patients	A 62.54 ± 1.29	A 7.61 ± 0.36	A 2.224 ± 0.31
LSD value	20.907^*	0.964^*	0.631^*

($P \leq 0.05$)*Different letters A, B significant differences as comparison between column.

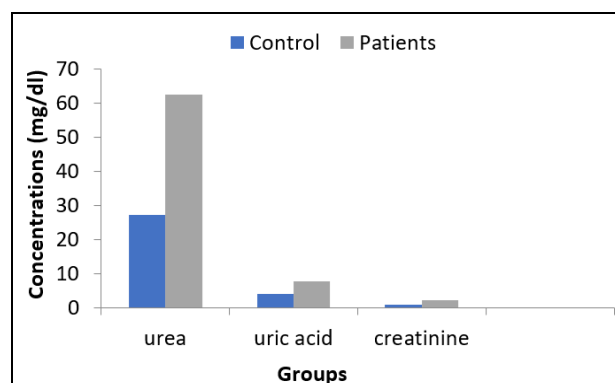


Figure (1): Comparison of renal function tests between cirrhotic patients and control.

The comparison of serum urea, uric acid and creatinine as markers of renal function test compared with control group as shown in figure (1).

The results presented in table (2) shows the effect of age categories on urea uric acid and creatinine levels ($P \leq 0.05$). The data indicate that elevation in the mean value of all parameters in the patients more than 60 years, reached (58.49 ± 14.76 , 7.73 ± 0.52 and 1.963 ± 0.37)mg/dl respectively. On the other hand, there were no significant differences in the mean value of urea, uric acid and creatinine between (41-60) year and (61-80) year.

Table (2): Study the effect of age categories on kidney function levels

Age categories	No. of patients	Mean \pm standard Error (Mean +SE)		
		B	B	B
27- 40 years	4	26.68 ± 1.11	4.01 ± 0.35	0.72 ± 0.05
41-60 years	10	A 50.38 ± 9.56	A 6.11 ± 0.55	A 1.78 ± 0.36
61-80 years	11	A 58.49 ± 0.52	A 7.73 ± 0.52	A 1.96 ± 0.37
LSD value	-----	18.0399^*	1.442^*	0.896^*

($P \leq 0.05$)*Different letters A, B significant differences as comparison between column

The statistical results in table (3) show a strong correlation ($r = 0.77^{**}$, $P \leq 0.01$) between urea and creatinine level and with uric acid ($r = 0.49^{**}$, $P \leq 0.01$). As shown in the same table, there is a positive correlation between uric acid and creatinine ($r = 0.50^{**}$, $p \leq 0.01$).

Table (3): The correlation between urea, uric acid and creatinine values in heart failure patients.

Parameters	Correlation	Significant
Urea, Uric acid	0.49	**
Urea, Creatinine	0.77	**
Creatinine, Uric acid	0.50	**

($P \leq 0.01$) **

DISCUSSION:

According to our results, renal function levels are raised in patients with heart failure compared with control. Renal disturbance contributes virtually to severity disease and death rate with heart failure¹⁸. BUN test was showed to be a significant predictor of severity disease and death rate in cardiac failure patients¹⁹. Blood urea values are effected by protein ingestion, degradation and absorption by tubules, it is not dependable indicator of renal function, but blood urea nitrogen increased may be a indicator of sever heart failure which involves declined heart output and an triggered neuro-hormonal status²⁰. High level of uric acid may be an important marker for predicting people with preexisting cardiac failure²¹. The connection between cardiovascular disease and serum uric acid has got a lot of interest over the years²². Adnan et al²³, observed the severity heart failure was correlation with serum uric acid value. Renal disturbance has been pertaining to dysfunction of heart output and relative

under filling of arterial perfusion²⁴. Assessment of kidney impairment is depend on alteration of creatinine level because it is indicator of kidney function rather than renal damage, serum creatinine depend on evaluation of renal function at the extremes of age, body size, gender, a history of heart failure (HF), diabetes, hypertension, anemia and high doses of diuretics^{25,26}.

CONCLUSION:

This study indicates that there were elevated in the mean value of urea, uric acid and creatinine in heart failure patients. Thus, renal dysfunction contributes to increase death rate in heart failure patients.

CONFLICTS OF INTEREST:

The author declares that there are no conflicts of interest regarding the publication of this paper.

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