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DETERIORATION OF RENAL FUNCTION WITH INCREASED MORTALITY IN PATIENTS WITH HEART FAILURE (HF)

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Abstract:

This study was conducted on patients who suffer from deterioration in kidney function, and this has another effect on heart failure. Information about patients such as age and gender was collected, in addition to the general characteristics of patients.

The results are presented as a mean (M) and a mean (SD) standard deviation. To compare the quantitative indicators of two independent groups with the normal distribution of the trait, Student (t-test) was used. Differences were considered significant at $P < 0.05$.

It was found that there were four stages between time one and time 2, stage 2 was kidney damage and a slight decrease in GFR 60 to 89 ml/min and stage 3 moderate decrease in GFR 30 to 59 ml/min as for stage 4 severe decrease in glomerular filtration rate from 15 to 29 ml/min and stage 5 stable renal failure less than 15 ml/min or when hemodialysis, statistically significant differences between the two stages were found greater or equal to 0.05 and FGe>60 ml/min was found at time 2 for patients While it was not found at the beginning of the study

Through the results, we conclude that there is a positive relationship between the parameters (deterioration of renal function and mortality in patients with heart failure), and this study is our findings support the hypothesis that renal impairment could be a marker for worsening HF.

Keywords: FGe, CKD, HF, Renal Failure, kidney disorders

INTRODUCTION

Heart failure (HF) affects approximately 5% people in Iraq, and Comorbidities clearly impact HF prognosis. Over the last two decades, the number of comorbidities and medications in the average HF patient has increased substantially, renal failure being among those [1,2].

Recently, several studies have reported an association between worsening renal function (WRF) during inpatient treatment for acute decompensated HF and poor clinical outcomes. 4-11 In chronic HF, reduced renal perfusion may occur over a long period, and patients may experience few symptoms related to the declining renal function.3 Several studies have found an association of WRF with mortality in the ambulatory setting [3,4,5,6,7]

It reveals that it is an important risk factor for lower CKD (by means of renal function and proteinuria regardless of the cause of chronic renal failure and the concept of CKD) is widespread. The condition that causes rapid kidney dysfunction is acute renal failure and has been named (Acute Renal Failure, ARF), so in recent years as acute kidney injury (AKI), where it is defined and classified by urine volume and serum creatinine level.

And When kidney function declines, the excretion of salt (sodium) and potassium that enters the body becomes insufficient [8,9,10]. If more is taken than you can excrete, the salt will be combined with water, and the fluid becomes excessive, resulting in

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hyperkalemia, which increases the potassium concentration as it causes an excess Fluid swelling and high blood pressure, and as it progresses, may lead to congestive heart failure and pulmonary edema [11,12,13]. It should be noted that hyperkalemia causes numbness in the hands and mouth, arrhythmia, weakness, and abnormal taste and may lead to cardiac arrest at high altitudes [14].

Lesions of the heart and kidneys are widespread in the population and often coexist, resulting in increased mortality and the risk of complications [15,16]. The development of renal dysfunction (RD) is one of the most common pathological conditions associated with congestive heart failure. Decreased myocardial contractility leads to a deterioration in the functional state of the kidneys [17,18,19], which in turn can lead to the development of heart failure [20,21].

Most studies have included only patients with heart failure with reduced ejection fraction (HFrEF), and follow-up has typically been short, investigating changes in renal function over no more than a six-month interval from baseline.
[22,23].

MATERIAL AND METHOD

Patient sample

This study was conducted in different Hospitals, in Iraq. where 30 patients were collected in order to know the deterioration of kidney function with an increase in mortality in patients with heart failure (HF). The analysis of data and demographic information for patients was based on the statistical analysis program SPSS 22 SOFT

Study design

This study was conducted on patients who suffer from deterioration in kidney function, and this has another effect on heart failure. Information about patients such as age and gender was collected, in addition to the general characteristics of patients.

Signs and symptoms of heart failure due to low ejection fraction are called low ejection fraction heart failure, or HFrEF. However, when a patient has signs and symptoms similar to low ejection fraction heart failure, but their ejection fraction is normal, the term maintenance heart failure is used (HFpEF) to describe the condition.

Glomerular filtration rate was estimated by applying the CKD-EPI equation to blood creatinine, which Presented by patients at the beginning and at the end of the study.

Serum creatinine was determined method with traceability to the reference method for mass spectrometry mitigation Isotopes (IDMS).

Study period

Information and demographic data were collected for patients with deterioration in renal function from 7-8-2020 to 16-4-2021

Aim of research

This paper aim to know the relation between deterioration of kidney function with increased mortality in patients with heart failure).

Statistical Analysis

Statistical analysis was performed using generally accepted methods of statistics using the Statsoft Statistica22 statistical software package for Windows Iraq and MS Excel X7.

The results are presented as a mean (M) and a mean (SD) standard deviation. To compare the quantitative indicators of two independent groups with the normal distribution of the trait, Student (t-test) was used. Differences were considered significant at $P < 0.05$.

Ethical statement

All approvals for this study were obtained by the hospital in which the study was conducted for a period of two and a half years, and all results were submitted to the patients individually.

RESULTS

Table 1- characteristics of patients

P	N	%
AGE		
25-34	2	6.1
35-44	16	48.5
45-54	9	27.3
55-60	3	9.1
Total	30	90.9

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Smoking		
non smoker	10	33.3
smoker	20	66.7
Total	30	100.0
risk factors		
Dyslipidemia	19	63.3
Non Dyslipidemia	11	36.7
Total	30	100.0
diabetes	10	33.3
Non diabetes	20	66.7
Total	30	100.0
hyperuricemia	9	30.0
non hyperuricemia	21	70.0
Total	30	100.0
Non Obesity	21	70.0
Obesity	9	30.0
Total	30	100.0
hypothyroidism	7	23.3
Non hypothyroidism	23	76.7
Total	30	100.0

From above table, the ages were distributed among four groups, from 25 to 60 years old, and the percentage of smokers was 66.7 percent. As for the risk factors, they included diabetes, dyslipidemia, hyperuricemia, obesity, in addition to hypothyroidism

Table 2- results of patient according to heart disease

heart disease					
		F	%	VP	CP
Valid	Hypertension	5	16.7	16.7	16.7
	ischemic	12	40.0	40.0	56.7
	other	6	20.0	20.0	76.7
	tachymyopathy	3	10.0	10.0	86.7
	Valvular	4	13.3	13.3	100.0
	Total	30	100.0	100.0	

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Table 3 - Type of heart and kidney disorders (Carbonyl olefin metathesis)

Carbonyl olefin metathesis * heart disease Crosstabulation							
Count							
		heart disease					Total
		Hypertension	ischemic	other	tachymyopath	Valvular	
	type 2 (chronic CRS)	4	7	4	2	3	**20**
	type 3 (acute kidney syndrome)	0	4	0	0	0	**4**
	type 4 (chronic kidney syndrome)	1	1	2	1	1	**6**
total		5	12	6	3	4	30

Ischemic was one of the most frequent percentages of heart disease with a percentage of 40%, and most of them were of type 2 (chronic CRS) and came in second place with a valvular rate of 13.3 %, and it was distributed among three patients for type 2 (chronic CRS) and one patient for type 4 (chronic kidney kidney). syndrome)

Figure 1- frequency Carbonyl olefin metathesis for patients

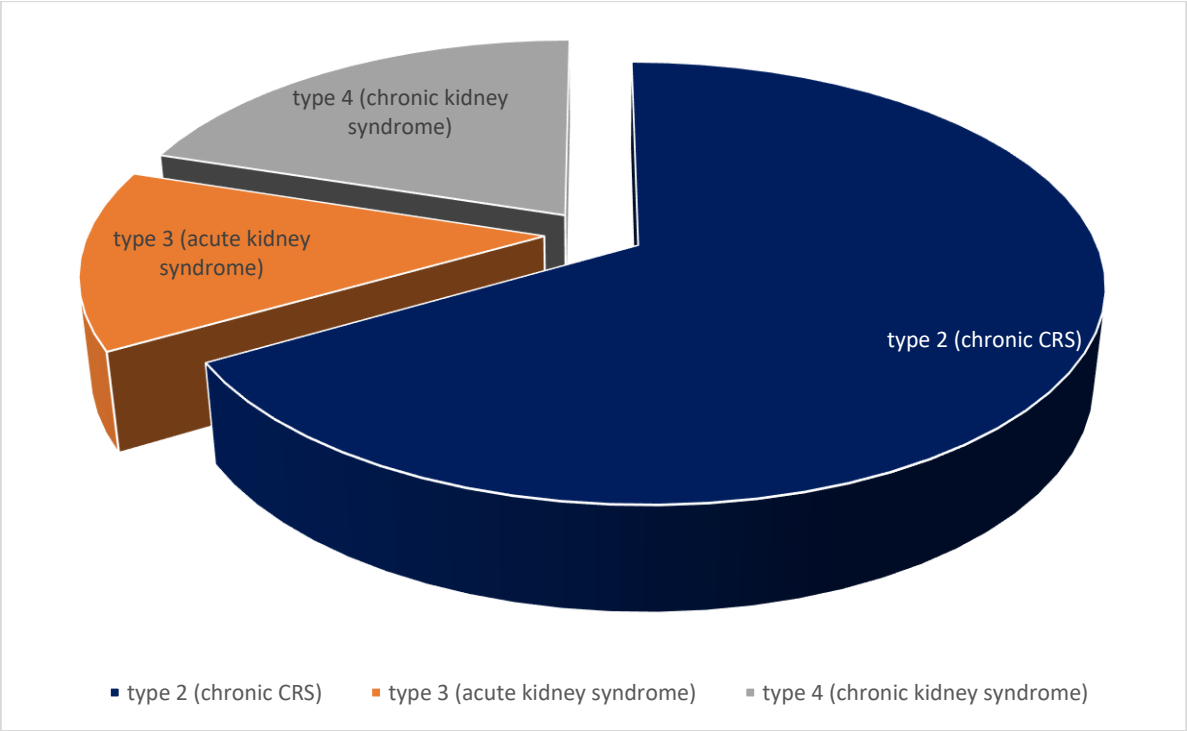

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Table 4- result of (time 1) start of study

Statistics

		creatinine	FGe	proteinuria	HB	in serum	Ca	Parathyroid hormone
N	Valid	30	30	30	30	30	30	30
	Missing	3	3	3	3	3	3	3
Mean		1.5373	46.3000	.2670	12.6787	140.7000	9.1567	122.6333
Std. Error of Mean		.04233	.88558	.00485	.01980	.30381	.02477	1.97948
Median		1.5700	46.5000	.2650	12.6650	141.0000	9.1000	118.5000
Mode		1.30[a]	40.00	.24	12.55[a]	141.00	9.10	111.00[a]
Std. Deviation		.23187	4.85052	.02654	.10843	1.66402	.13566	10.84207
Skewness		-.203	.297	.205	.700	-.064	.604	.411
Std. Error of Skewness		.427	.427	.427	.427	.427	.427	.427
Range		.81	15.00	.08	.35	5.00	.40	36.00
Minimum		1.10	40.00	.23	12.55	138.00	9.00	105.00
Maximum		1.91	55.00	.31	12.90	143.00	9.40	141.00
Percentiles	25	1.3750	42.0000	.2400	12.5800	139.0000	9.0750	114.5000
	50	1.5700	46.5000	.2650	12.6650	141.0000	9.1000	118.5000
	75	1.7000	49.0000	.2900	12.7400	142.0000	9.3000	134.2500

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Figure 2 - results of patients according to echocardiographic (time 1) by %

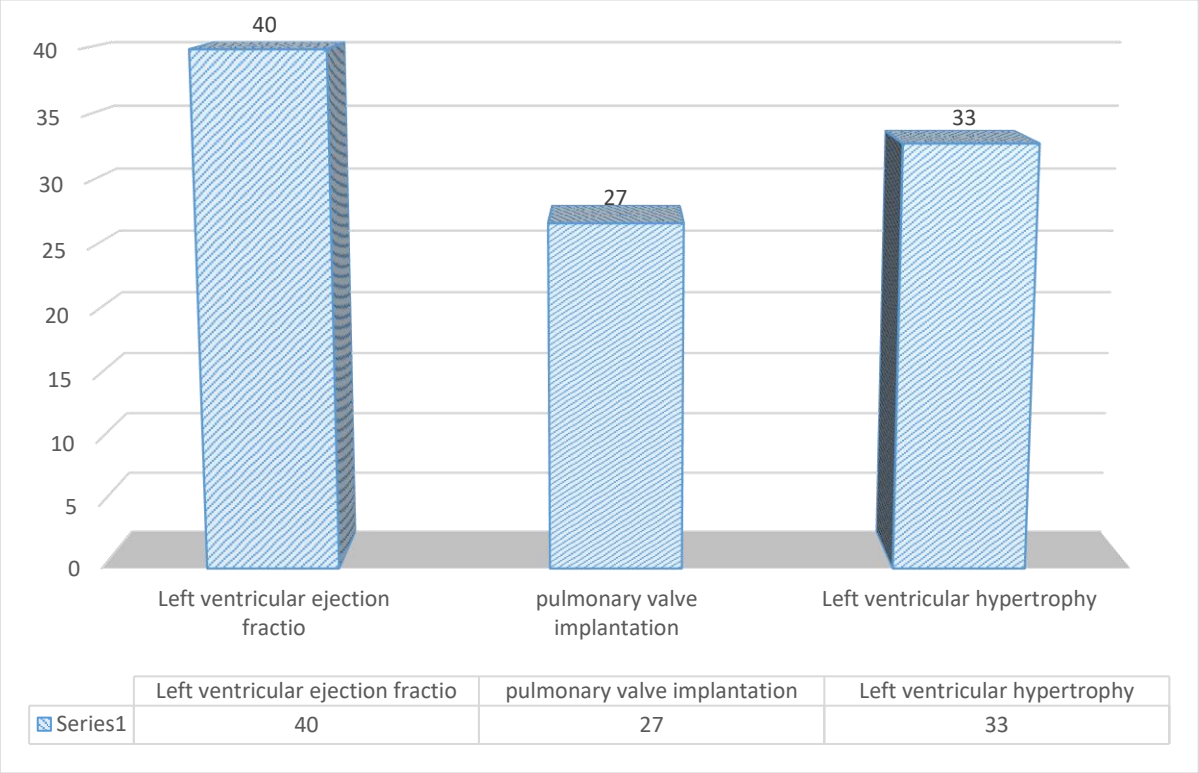

Table5 – results of patients according to time2

Statistics								
		creatinine	FGe	proteinuria	HB	in serum	Ca	Parathyroid hormone
N	Valid	30	30	30	30	30	30	30
	Missing	3	3	3	3	3	3	3
Mean		1.923	37	0.31	11.9	139.23	8.91	188.98
Std. Deviation		0.89	3.7	.01	0.345	1.88	0.22	40.23
Minimum		1.01	33	0.29	11.2	137	8.1	130
Maximum		2.7	41	0.32	12.29	142	9.13	230
a. Multiple modes exist. The smallest value is shown								

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Figure 3- p-value of results

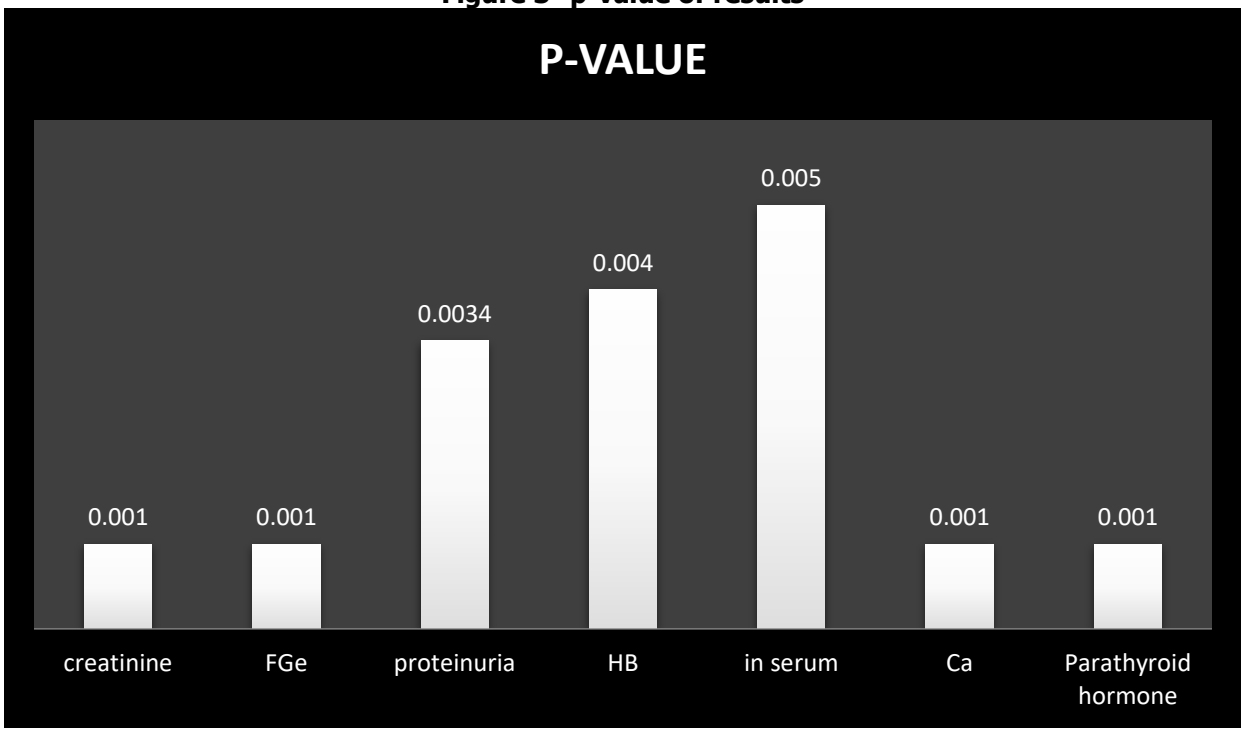

Table 6 – CKD results (T1)

		CKD			
		F	%	VP	CP
Valid	G5	3	9.1	10.0	10.0
	G4	6	18.2	20.0	30.0
	G3b	6	18.2	20.0	50.0
	G3a	15	45.5	50.0	100.0
	Total	30	90.9	100.0	
Missing	System	3	9.1		
Total		33	100.0		

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Figure 4- CKD according to age of patients

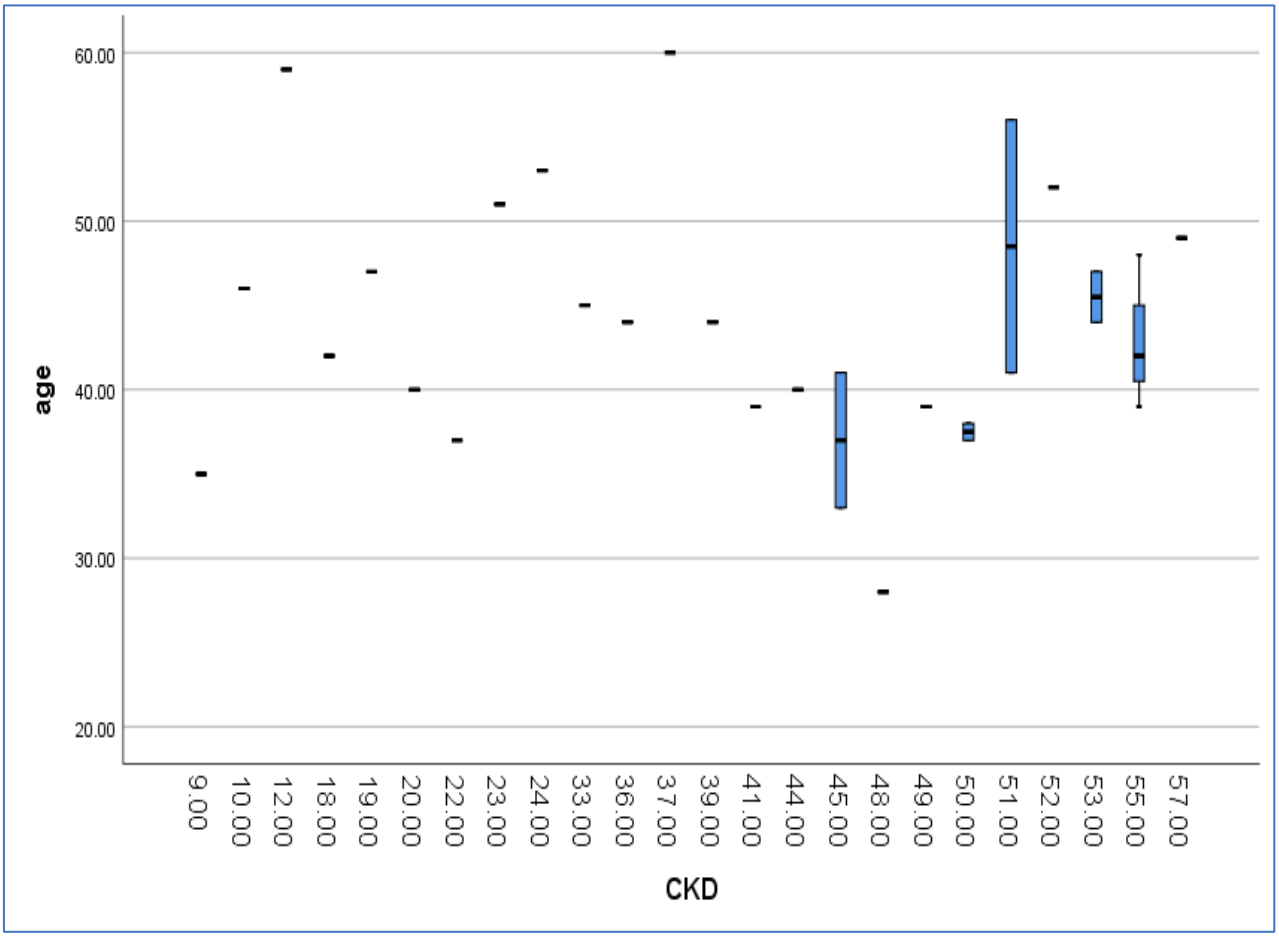

Figure 5- P-Plot statically analysis of CKD T1

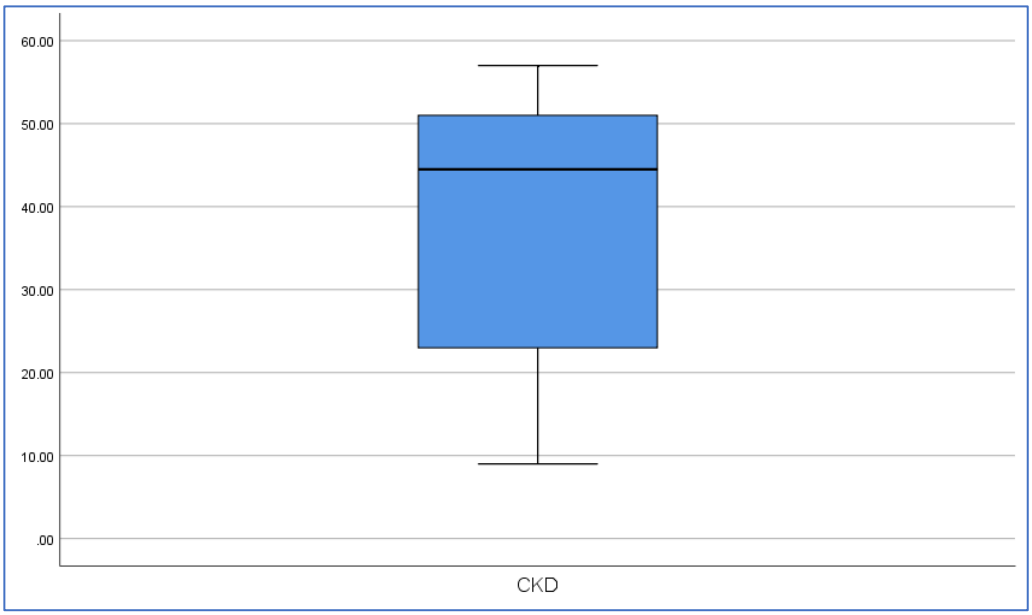

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Figure 6- compression between Results related to the end of the study time 2 (CKD) and time 1

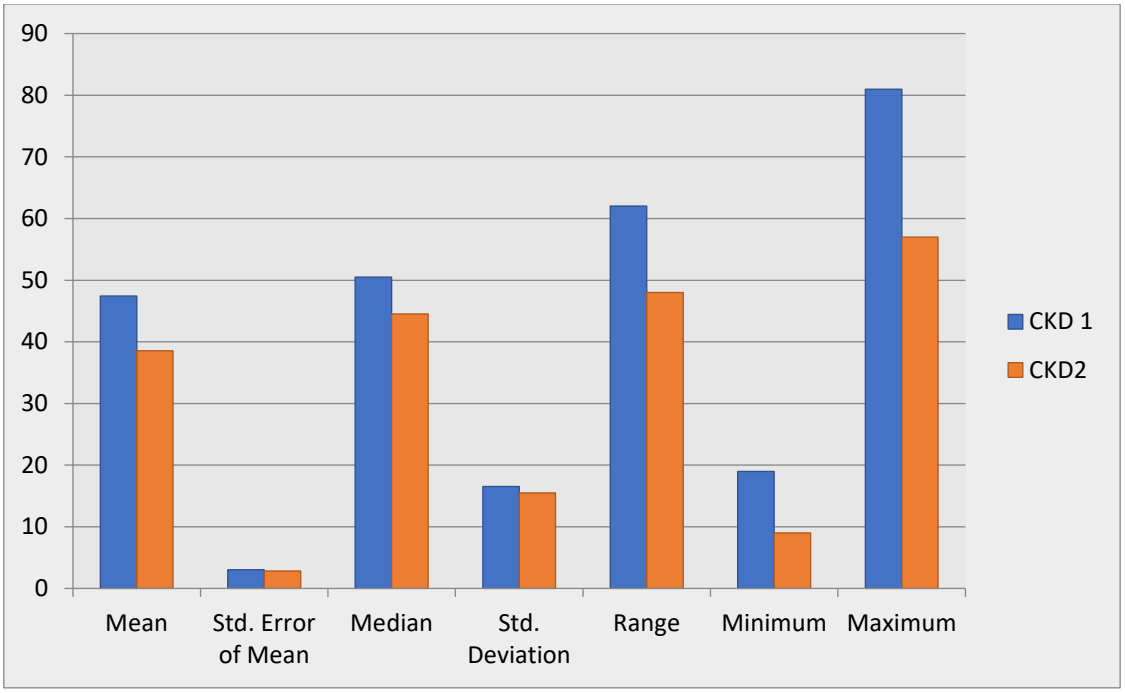
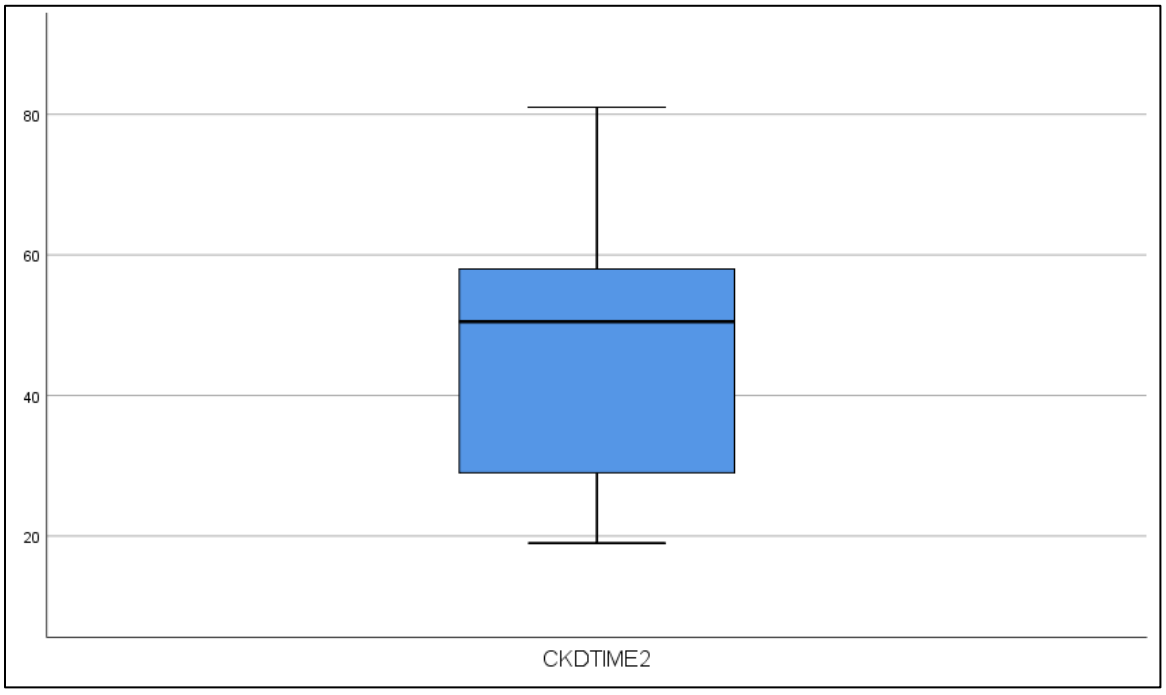


Figure 7- p-plot CKD TIME 2



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DISCUSSION

Thirty patients were collected from different Hospitals, in Iraq. where the research aimed Knowing the causes and factors leading to the deterioration of the function of the kidneys with patients (HF).

The statistical value was found to the age of the patients represented by the real value, and the arithmetic mean (43.86 ± 7.44), and the average age of the patients ranged between 28 and 60 years as shown in the table below

Table 7- mean SD for age of patients

Statistics

age

N	Valid	30
	Missing	3
Mean		43.8667
Std. Deviation		7.44512
Range		32.00
Minimum		28.00
Maximum		60.00

By reading the characteristics of the patients, we find that the majority of patients were smokers, which represented 66.7 %, in addition to dyslipidemia, also represented by 63.3. As for diabetes, it was 33.3 patients with diabetes, and the vast majority were non-diabetics, as shown in table 2.

It is well known that the heart and kidneys and their synergies are crucial for equilibrium in the circulatory system. In the field of nephrology, it has been recognized that cardiovascular disease and kidney disease often coexist, despite the widespread belief that kidney disease leads to cardiovascular disease; however, it is not always recognized that cardiovascular disease can induce or exacerbate renal dysfunction, further deteriorating heart function and creating a vicious cycle.

Regardless of the ejection fraction, the consequences of renal disfunction on both organs making cardiovascular disease the leading cause of renal disease risk factors. Furthermore, with respect to the pathophysiology, we sought to establish the main role of fluid overload and venous congestion (including hypertension) renal venous blood) in the pathogenesis of acute and chronic renal dysfunction in heart failure.

Diabetic patients were classified, in addition to patients with high blood pressure and heart disease, as being the majority of those who suffer from a clear deterioration in kidney function, as blood pressure is in a direct relationship with kidney function and can generate significant and clear damage and by reading previous studies related to this topic Cardiovascular disease and kidney disease are closely related.

20 times. Likewise, if kidneys are damaged by diabetes, your risk of heart attack is much higher due to sugar. Diabetes can also affect heart and blood vessels.

electrolyte levels such as potassium and sodium (salt). High potassium levels can cause an irregular heartbeat, and high sodium levels can cause moderately high blood pressure.

Chronic kidney disease also alters the balance of calcium and phosphorous levels in the blood, which may eventually lead to calcium deposits in the blood vessels and heart, also called

Arteriosclerosis. Lack of good control of calcium and phosphorous levels increases long-term risks. A class of medications called phosphorous binders may help control this condition.

Chronic kidney disease usually causes anemia, which is a decrease in the number of red blood cells, and the heart has to work harder to maintain the level of oxygen in the blood, and if the heart is overloaded, the heart muscle enlarges, which can lead to heart failure.

The main indicator of kidney function is the level of creatinine in the blood, which is a body waste product produced by muscles and excreted by the kidneys. In case of decreased kidney function, creatinine builds up in the blood, causing the creatinine level to rise when the blood is tested.

Kidney function is best measured by an indicator called the GFR (glomerular filtration rate), which measures the rate at which the blood is filtered by the kidneys. This indicator allows to determine if kidney function is normal and, if not, to what level low kidney function has deteriorated.

CONCLUSION

In most people, chronic kidney disease eventually progresses regardless of treatment. The rate of decline in kidney function varies somewhat with the underlying disorder causing the chronic kidney disease and the degree of control over the disorder. For example, diabetes and high blood pressure, especially when poorly controlled, cause a more rapid decline in kidney function. Chronic kidney disease leads to death when

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treatment is neglected. In addition, we conclude that CKD patients have a higher risk of death from heart disease and death from any cause other than starting renal replacement therapy.

Through the results, we conclude that there is a positive relationship between the parameters (deterioration of renal function and mortality in patients with heart failure), and this study is our findings support the hypothesis that renal impairment could be a marker for worsening HF.

RECOMMENDATION

1. There are no signs or symptoms of early chronic kidney disease
2. Chronic kidney disease usually does not go away.
3. Kidney disease can be treated.
4. The earlier you know you have it, the better your chances of receiving effective treatment.
5. Blood and urine tests are used to check for kidney disease.

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