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MEASUREMENT OF RENAL BIOMARKER IN PATIENTS WITH RENAL FAILURE(DIALYSIS) DIFFERENT AGE GROUPS

Fatima Ressan Lahhob
Department of pathological analyzes, College of Science, University of Sumer

Maysam Samer Hasan
Department of Biology, College of Science for Girls - University of Baghdad

Ahmed Jasim M. Almuttrek
Dhi-Qar Health Directorate, Iraqi Ministry of Health, Nasiriya, Iraq

Thekrayat Joodi Jassim
Department of pathological analyzes, College of Science, University of Sumer

Fatima Turki Abdul Hussein
Department of pathological analyzes, College of Science, University of Sumer

Abstract

The kidneys play a key role in maintaining a constant internal environment. This is achieved by regulating body fluid volumes and their content in various dissolved substances, including electrolytes and various products of metabolism. With declining kidney function, these functions are wholly or partially lost. The result is a difficulty in volume regulation and the accumulation of various substances in supra-physiological concentrations. This study included(42 patient with renal failure) that compared with 42 healthy control groups, this study was conducted in the dialysis center of Al-Rifai General Hospital in Al-Rifai city. The result of this study shown the there was a highly significant P- Value (<0.001) increase of urea in patient groups(mean±SD= 107±35.5)than control group (mean±SD= 32.5±6.36). the there was a highly significant P- Value (<0.001) increase of creatinine in patient groups(mean±SD= 5.45±2.40)than control group (mean±SD= 0.724±0.200).In this study concluded that urea increase in patients compare with control in highly significant. Highly significant appear in high creatinine with patients compare to control. Ages of patients and control are close and that display not there any relation between ages and Kidney failure

Key words: *body fluid volumes, supra-physiological*

Introduction

The kidneys play a key role in maintaining a constant internal environment. This is achieved by regulating body fluid volumes and their content in various dissolved substances, including electrolytes and various products of metabolism. With declining kidney function, these functions are wholly or partially lost. The result is a difficulty in volume regulation and the accumulation of various substances in supra-physiological concentrations. When these have proven deleterious effects on cell metabolism, they are referred to as uremic toxins. Urea and creatinine are well known uremic toxins but several others have been identified [1,2]. The accumulation of these toxins as kidney function diminishes, contributes to the increased morbidity and mortality in these patients, and cause "uremic symptoms" unless some form of renal replacement therapy is instituted. Uremic toxins are a diverse group of substances classified according to their molecular weight, solubility and protein binding. These toxins accumulate in life-threatening concentrations in end stage renal disease, when a form of renal replacement therapy, i.e. dialysis or transplantation becomes necessary. Transplantation of a kidney is the best renal replacement therapy as it is associated with the best survival [3,4]. However, its availability is limited to only a small proportion of patients as result of organ shortages and the growing prevalence of chronic kidney disease (CKD) and end stage renal disease (ESRD). The majority of incident patients with ESRD therefore have to receive either haemodialysis (HD) or peritoneal dialysis (PD)[5,6].

Chronic kidney disease (CKD) is divided into five stages; thus, the global term "compensated renal insufficiency" should no longer be used . It is important to know whether a patient is suffering from renal insufficiency (CKD stages 2 through 5) and, if so, at what stage, because roughly half of all drugs or their metabolites are excreted by the kidneys, and 30% of all adverse effects of medication have either a renal cause or a renal effect [5].

Chronic renal failure is a metabolic condition that means an irreversible loss of the kidney's ability to excrete waste products and to regulate electrolyte and water balance. It is a condition with consequences for many of the body's structures. The condition is associated with cardiovascular dysfunction, anaemia, malnutrition, muscle wasting, muscle weakness, neuropathy, glucose intolerance, reduced bone density and reduced psychosocial functioning as well as reduced quality of life. The incidence and prevalence of chronic renal failure is increasing, and these patients will therefore be seen more frequently at physiotherapy outpatient clinics [6].

Alternatively, the biochemical marker creatinine found in serum and urine is commonly used in the estimation of GFR. Creatinine clearance (CrCl) is the volume of blood plasma cleared of creatinine per unit time. It is a rapid and cost-effective method for the measurement of renal function. Both CrCl and GFR can be measured using the comparative values of creatinine in blood and urine. Glomerular Filtration Rate The GFR in the measurement of volume filtered through the glomerular capillaries and into the Bowman's capsule per unit of time [7].

Urea or BUN is a nitrogen-containing compound formed in the liver as the end product of protein metabolism and the urea cycle. About 85% of urea is eliminated via kidneys; the rest is excreted via the gastrointestinal (GI) tract. Serum urea levels increase in conditions where renal clearance decreases (in acute and chronic renal failure/impairment)[8]. The kidneys play a vital role in the excretion of waste products and toxins such as urea, creatinine and uric acid, regulation of extracellular fluid volume, serum osmolality and electrolyte concentrations, as well as the production of hormones like erythropoietin and 1,25 dihydroxy vitamin D and renin. The functional unit of the kidney is the nephron, which consists of the glomerulus, proximal and distal tubules, and collecting duct. Assessment of renal function is important in the management of patients with kidney disease or pathologies affecting renal function. Tests of renal function have

utility in identifying the presence of renal disease, monitoring the response of kidneys to treatment, and determining the progression of renal disease. According to the National Institutes of Health, the overall prevalence of chronic kidney disease (CKD) is approximately 14%. Worldwide, the most common causes of CKD are hypertension and diabetes[11_13]. Chronic kidney disease (CKD) is very prevalent in the general adult population. Data from the United States estimate a prevalence of 13.1% among adults, which has increased over time. In Brasil, estimates of the prevalence of the disease are uncertain. A recent study reviewed the data available in the literature and found that the prevalence varied according to the method employed in the definition of the disease; by populational criteria, 3-6 million individuals are estimated to have CKD. The 2017 census by the Brazilian Society of Nephrology (BSN) reported that the total estimated number of patients on dialysis was 126,583, and the national estimates of the prevalence rates and incidence of patients under dialysis treatment per million population (pmp) was 610. In addition to being highly prevalent, CKD is associated with a higher risk of cardiovascular disease, severity, and death. In fact, global data from 2013 showed that the reduction in GFR was associated with 4% of deaths worldwide, i.e., 2.2 million deaths. More than half of those deaths were due to cardiovascular causes, while 0.96 million were related to end-stage renal disease. The aforementioned SBN census found a gross annual mortality rate of 19.9% on dialysis[12]. Acute Kidney Disease (AKD) or called Acute kidney injury (AKI) is defined as an acute decline in the kidneys' ability to filter water and waste products. The resulting increase in metabolites, e.g. creatinine and cystatin C is what forms the basis for how kidney function is measured and thereby diagnosed. Though intense and ongoing research on the topic of kidney biomarkers is being conducted, most hospitals and outpatient clinics and still use creatinine, urea, and urine output as a measure of kidney function. Some clinics have introduced cystatin C as a supplement. AKI is common during critical illness. It is unclear how these commonly used kidney biomarkers are affected in patients during the time in the intensive care unit. Considering the most apparent effects of an ICU admission: circadian confusion caused by the ICU milieu, the physiological stress to the body and organs of critical illness, the treatment therapies, and the extensive muscle wasting. No organ goes free not even the kidney [21,22]. The present study Aims to Measurement of urea and creatinine concentration for patients with renal failure different age groups also this study aims to Comparison the level of urea and creatinine concentration in patient group with the control groups.

Materials and Methods:

2.1. Design of Study:

This study included(40 patient with renal failure) that compared with 40 healthy control groups, this study was conducted in the dialysis center of Al-Rifai General Hospital in Al-Rifai city.

2.2. Collection of Blood Sample:

About 4mL of blood samples from dialysis center of Al-Rifai General Hospital with and controls were taken and allowed to clot at room temperature in disposable tubes centrifuge to separate it in the centrifuge at 3000 rotor per minute (rpm) for 10 min, serum samples were separated and stored at (-20°C) for later measurement of biochemical parameters, unless used immediately. In this study measure of Urea Kit (Biolabo\France) and Creatinine Kit (Biolabo\France) by spectrophotometry.

2.3 Statistical analysis

Data analyses were performed through statistical package for social sciences (SPSS) version 26 for Windows. If the P value was less than 0.05, the findings were deemed meaningful. Baseline

characteristics were assessed with the student's t-test for continuous variables, and the x^2 test for categorical variables, with two-tailed P-values, less than 0.05 taken as significant.

Results and Discussion

This study included 84 cases(42 as patient and 42 as control) , this study included that taken 22 male and 20 female in the control study groups, whereas taken 19 male and 23 female in the patient study groups, it is used spectrophotometry method to measure of urea and creatinine level for all 84 sample as shown in figure (3-1).

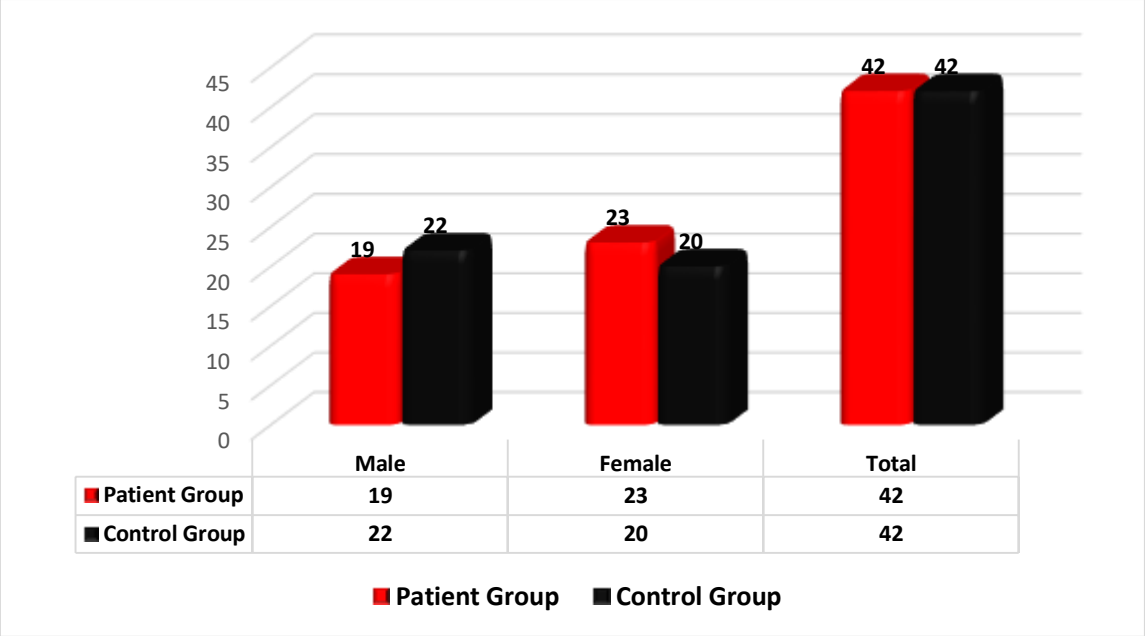

Figure (3-1): The demographic characteristic of study.

Table (3-1): Statistical analysis of urea in control group compared with patient group by using T- test.

Variable		Control Groups	Patient Groups	P-Value
Gender	**M\F**	**22\20**	**19\23**	**0.663**
Age(year)	**Mean**	**42.5**	**43.0**	**0.806**
	Standard deviation	**8.20**	**7.76**	
	Minimum	**30.0**	**25.0**	
	Maximum	**60.0**	**60.0**	
Urea (mg\dl)	**Mean**	**32.5**	**107**	**<0.001**
	Standard deviation	**6.36**	**35.5**	
	Minimum	**19.0**	**50.0**	
	Maximum	**44.0**	**193**	

In the table (3-1) shown the there was a highly significant P- Value (<0.001) increase of urea in patient groups(mean±SD= 107±35.5)than control group (mean±SD= 32.5±6.36)

Table (3-2): Statistical analysis of creatinine in control group compared with patient group by using T- test.

Variable	Control Groups	Patient Groups	P-Value

Creatinine (mg\dl)	**Mean**	**0.724**	**5.45**	**<0.001**
	Standard deviation	**0.200**	**2.40**	
	Minimum	**0.500**	**1.90**	
	Maximum	**1.30**	**9.50**	

In the table (3-2) shown the there was a highly significant P- Value (<0.001) increase of creatinine in patient groups(mean±SD= 5.45±2.40) than control group (mean±SD= 0.724±0.200).

Conclusions

1. Urea increase in patients compare with control in highly significant.
2. Highly significant appear in high creatinine with patients compare to control.
3. Ages of patients and control are close and that display not there any relation between ages and Kidney

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