THE RELATIONSHIP OF SOME DISEASES AND BIOCHEMICAL VARIABLES IN PATIENTS WITH KIDNEY FAILURE IN THE CITY OF MOSUL

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Abstract
The current study dealt with knowledge the relationship between disease rates and some biochemical variables in patients with chronic renal failure visiting the dialysis centers at Al-Salam and Ibn Sina Teaching Hospital,Samples numbering 130 Were collected,100 of which were for patients and 30 samples for healthy people of both sexes,considered as acontrol group, asSome biochemical variable were measured (measuring the concentration of urea,creatinine,uric acid and albumin)as indicators of the performance of kidney functions.The results of the current study showed clear variations in the rates of disease associated with this disease and the concentrations of the variables measured in these patients who suffer from chronic kidney failure,as the percentage of patients suffering from blood pressure reached the highest percentage among these patients,which is 31.5%.then came the apercentage of 28.8% of people among these patients suffering from other diseases,and the lowest percentage was 11.7% of people who were suffering from diabetes ,As for the biochemical variables ,they all showed significant differences between the studied groups (males and females) and the control groups, reaching the percentage of increase in urea concentration in male and female patients was (45.66%) respectively compared with the control group, while the percentage of increase in creatinine concentration was (40 and 38%) respectively in males and females with this disease,while the percentage of decrease in the concentration of uric acid and albumin in the serum of males with kidney failure (45 and 32%) compared to the percentages of decrease in their concentrations in the serum of females with kidney failure ,which are 83 and 26%,respectively.
Keywords: kidney failure, variables, blood, serum, patients .

Introduction

Kidney failure, also known as end-stage kidney disease, is a disease state in which the kidneys function at less than 15% of the normal rate. Kidney failure Is classified into acute kidney failure, which may develop quickly, and chronic kidney failure, which develops slowly. Symptoms may include leg swelling, feeling tired, vomiting, loss of appetite, and confusion. Complications of acute and chronic kidney failure include uremia and high levels of potassium in the blood. They also include heart disease, high blood pressure, and anemia (Hopkins, 2017). Diagnosis of Acute kidney failure often depends on a group of factors such as decreased urine output or increased creatinine in the blood. The diagnosis of chronic kidney failure depends on the glomerular filtration rate (GFR) less than 15 or the need for kidney replacement therapy (Ghazi *etal*., 2020). The functions of the kidneys represented to maintain salts formation, volume retention, extracellular fluid osmosis, and the excretion of final wastes or body metabolic waste such as creatinine and urea. If unused metabolism in the body is not removed successfully or there Is an accumulation In the body, the substances produced by the body can become toxic and have serious consequences for the body. Unused metabolic substances such as urea and creatinine increase. If the kidney's ability to function Is only 5% or less than 5%, the patient needs dialysis treatment or a kidney transplant.Hemodialysis is the artificial method of removing toxic metabolic products and toxic fluids from the blood when the kidneys are unable to do this task properly (Andrews *etal*., 2019). The most common type of dialysis is hemodialysis .kidney dialysis is one of the methods of kidney replacement therapy, in this technique. Body wastes such as urea, creatinine and free water are removed from the blood. The principle of dialysis is to diffuse solutes through a semi-permeable membrane. The cost of a kidney transplant is very high and there are high chances of rejection. The dialysis process Is performed two to three times a week, and the duration of dialysis Is from two hours to the duration of dialysis Is from two to four hours. The time of dialysis depends on various factors, including kidney function, the amount of waste in the body, the level of salts, and body weight (Ul-Amin *etal*.,2014).

Statistical analysis

The results were analyzed statistically using a Complete Randomized Design (C.R.D), and the differences between the studied groups and the control group were determined using the Duncuns Multiple Range Test for all variables studied, at a probability level of ($p \leq 0.05$), whichh was considered a significant difference. Using the statistical program(SPSS Statistics Version-24), which is ready to find the mean ± standard error (Hinton, 2004).

Materials and Methods

Blood Sample Collection

Blood samples were collected before performing the dialysis procedure. Venous blood was drawn at a rate of (5-6) ml before dialysis from the person suffering from kidney failure himself, taking into aconsideration the exclusion of hemolysis blood samples and blood samples of patients with viral hepatitis. To exclude an incorrect result, the blood was divided Into Parts::In the first part of the blood, 1 ml of venous blood was placed In plastic anticoagulant tubes containing Ethylene Diamine Tetracetic Acid. The tests included the blood components, both the volume of packed cells (PVC) and the number of blood cells.pvc), the number of platelets, and the concentration of hemoglobin (HB Hemoglobin). The samples were analyzed using an Auto Hematology Analyzer from company Rayto, a Chinese origion.

As for the second part, the remainder of the blood (3-4 ml) was placed in tubes with a tight cap, dry and devoid of an anticoagulant called Jell tube. The tubes were placed at room temperature for 20 minutes, then we used the Centirfuge device at a speed of (9000 x g).) for 15 minutes, for the purpose of obtaining blood serum, dividing It into parts and placing them in dry, sterile plastic Eppendrof tubes and storing them In a deep freezer at (-20) degrees C until the biochemical tests required in this study are collected.

Results and Discussion

1- Incidente rate in Chronic kidney Disease

This study was conducted in hospitals in the city of Mosul, where the number of visiting patients the dialysis center of Ibn Sina Teaching Hospital was 358 patients, with a percentage of55.8% males and 44.1% females, , where the number of patients with blood pressure reached 28.4%, diabetes patients 11.7%, and viral hepatitis patients 10.3%, and

the number of patients with both diseases, blood pressure and diabetes, reached about 14.2%. and in Al-Salam Teaching Hospital, the total number of patients was 166 patients, with a percentage of 60.2% males and 38.5 females.Previous studies have shown that the number of males suffering from chronic kidney failure Is higher than females, and that men progress at a faster rate to the end stage of kidney failure (ESKD) compared to women. This means that males are more susceptible to developing a kidney disease, such as proteinuria. This disparity is due to Many different factors are shared between the sexes, such as diet, size of the kidneys and glomeruli, differences in glomerular hemodynamics, and direct effects of sex hormones (Silbiger and Neugarten, 2008).Previous studies indicate that the progression of kidney disease is faster In men than in women, and this is due to...Primarily to the direct actions of sex hormones on metabolism (Neugarten and Golestaneh, 2019).Other studies have shown that the lower glomerular filtration rate (GFR) in males compared to females Is linked to the rate of disease progression, which may occur more quickly in males than In females, which increases the chances that these patients will be in more advanced stages of the disease (Neugarten *etal*., 2000).While other studies have shown that there Is no difference or even faster progression of chronic kidney disease in women compared to men. It was assumed that gender differences in the development of chronic kidney disease can be attributed to multiple factors, including sex hormones, renal hemodynamics, and differences in renal mass between men and women (Murphy *etal*. 2016).There are several factors that affect chronic kidney disease, such as diabetes, high blood pressure, enlarged prostate gland, kidney stones, urinary bladder cancer, kidney cancer, kidney infection, rheumatic diseases, and partial or complete blockage of the kidney artery (Salman and Alkaaby, 2023).

2-Effect of Chronic Diseases in CRF Infection

1-2 Effect of Diabetes Disease in CRF Infection

The results of this study in Table (1) showed that 11.7% of people with chronic kidney failure also have diabetes, apercentage 6.4% males and 5.3% females,as patients with diabetes mellitus are the main cause of chronic kidney disease, especially kidney failure, in both developed and developing countries (McMellan and Flanders,2003).Studies indicate that inherited factors play a major role in people's susceptibility to infected with kidney complications resulting from diabetes. The first sign of diabetic nephropathy is the appearance of small amounts of protein In the urine (proteinuria). As proteinuria and high blood pressure increase, kidney function declines, and complete loss occurs. Kidney function has different urinary levels among patients with type 2 diabetesThe second, but it eventually occurs in 30% of cases of proteinuria (Reutens *etal.*,2008).Other studies indicate a relationship between the duration of diabetes mellitus and the incidence of chronic kidney disease, for example, in South Korea, India, and Thailand. In this study, the average age of females and males with diabetes was 47 and 52 years, respectively. The lower average age of females with diabetes, which in turn Indicates a possible reduction in the duration of diagnosis of diabetes, can be considered the main reason for the differences found between females and males. Since female sex hormones have effects Protective on kidney function, which is reversed by hyperglycemia, kidney damage may appear later in females than In males (Ma *etal*,2021).Recent studies Indicate that diabetes mellitus Is an independent risk factor for developing chronic kidney disease in females, while newly diagnosed diabetes, perhaps of shorter duration, is not associated with the occurrence of chronic kidney disease (Parizadeh *etal*., 2019).

2-2Effect of hypertension Disease in CRF Infection

The results in Table (1) show that 28.4% of kidney failure patients also suffer from high blood pressure, apercentage 18.4 males and 10% females ,as It is one of the Influential factors causing kidney failure, which makes It consistent with the study conducted by (Salman and Alkaaby, 2023).High blood pressure and kidney disease are closely linked.Arterial hypertension accelerates many forms of kidney and leads to the progression of the disease to end –stage renal disease (ESRD)(Luke,1999).

The effect of high blood pressure on the occurrence of chronic kidney disease for both females and males,it is a risk factor for developing chronic kidney disease,which is consistent whith many studies .(Herget-Rosenthal *etal*.,2013).The lower risk of chronic kidney disease in females compared to males is due to differences in female sex hormones,controlled high blood pressure,and lower compliance with treatment in males compared to females (Duru *etal*.,2008;2023,Mayne *etal*).Recent studies have demonstrated the importance of continuous lowering of blood pressure to slow the progression of many forms of kidney injury ,especially glomerular disease(Agodoa *etal*.,2001;2004,Galiatsou) ,and in the long term this may lead to damage to the heart and blood vessels.The system caused by high blood pressure is the main cause for patients And mortality among patients with ESRD. (Redon,2010). Before the development of effective antihypertensive agent, 40% of high blood pressure patients became have morbid kidney , and 18% of patients became have kidney failure (Johnson,2005).

3-2Effect of hepatitis Disease in CRF infection

the results of this study In Table (1) show that 10.3% of kidney failure patients are infected with the various types of hepatits virusesapercentage 4.7% males and 5.6% females were Hepatitis I virus (HIV, Hepatitis B HBS virus, Hepatitis C HCV virus).

Chronic kidney disease is a growing healthy problem throughout the world. The reason for its spread is a decrease in the glomerular filtration rate (GFR) or an increase in urinary albumin excretion. It affects about 10% of the population, according to some population studies. Traditional risk factors for chronic kidney disease include demographic factors such as age, gender, and lifestyles. Smoking, alcohol consumption, physical exercise, comorbidities such as diabetes, arterial hypertension, anemia, and weight gain, and chronic hepatitis C virus infection have also recently been associated with the risk of chronic kidney disease in the general population and among Individuals infected with HIV. (Fabrizi *etal*., 2016). The Infection with virus Hepatitis B Is an important cause of liver disease and cancer and affects about 400 million people around the world. In addition to other diseases associated with the hepatitis B virus, mixed vasculitis, polyarteritis nodosa, and kidney disease. The most common type of glomerulonephritis associated with the hepatitis B virus Is Membraous nephropathy. HBV promotes apoptotic cell damage in tubular cells of the kidney. Insulin resistance and oxidative stress have been linked to hepatitis B infection. Both conditions may contribute to kidney injury (Fabrizi etal., 2017). Approximately 71 million people are Infected with HCV wourld wide,leading to 399,000 death mainly due to cirrhosis or hepatocellular carcinoma.the prevalence of HCV is higher in people undergoing chronic dialysis. It is spread by injections through exposure to blood through the skin, which makes dialysis patients more susceptible to infection. Therefore, all patients undergoing dialysis must be examend. Patients undergoing dialysis are tested every 6 months thereafter (Khan *etal*., 2020).

%	Patient Number	Chronic Disease
11.7	42	Diabetes
28.4	102	Hypertension
10.3	37	Hepatits
14.2	51	Hypertension +Diabetes
35.1	126	Other Disease

Table (1): Incidence rates of chronic diseases associated with kidney failure under study at Ibn Sina Teaching Hospital

%Low	% inc	%con	Patient female	Control female	%inc	%con	Patient male	Control male	Parameters
			Mean ± Stander deviation	Mean± Stander deviation			Mean± Stander deviation	Mean± Stander deviation	
	166	266	2.05±85.33 *a	4.00±32.00* b	145	245	1.70±82.66* a	3.78±33.66* b	Urea mg/dL
	138	238	0.35±2.03* a	0.05±0.85* b	140	240	0.78±2.40 *a	0.10±1.00* b	Creatinine mg/dL
	83	183	0.85±10.80 *a	1.83±5.89* b	45	145	1.35±10.23* a	0.26±7.01* b	Uric acid mg/dL

Table (2) The effect of chronic kidney disease on some variables urea, creatinine and uric acid.

The effect of chronic kidney disease on kidney function 3-1-3The effect of chronic kidney disease on urea concentration

The results In Table (2) showed that there was a signIficant increase in urea concentration in both sexes, as the percentage of increase reached (145%) for male patients and (166%) for females compared to the control group.

There are many biochemical variables to detect kidney failure, the most important of which are blood urea and creatinine, which evaluate kidney function. Urea concentration begins to rise in the early stages of chronic kidney disease, and the damage caused by urea has progressed significantly by the time, The patient reaches end-stage renal disease and begins dialysis, whichh may limit the benefits of urea-lowering interventions for end-stage renal disease (Lau and Vaziri, 2016).

The most Important disease that leads to an increase in the concentration of urea and creatine in the serum, In addition to a decrease In the glomerular filtration rate (GFR), is kidney failure (Meenakshi, 2016). The lack of excretion of urea outside the body causes its accumulation in the blood, so its concentration in the blood increases. ThIs is because urea Is an Nitrogenous substance resulting from metabolic wastes that are mainly formed In the liver (Ali *etal*., 2017).

The concentration of both urea and creatinine is used as diagnostic tests for the performance of kidney functions, and it is known that a high level of urea and creatine concentration Indicates the presence of a defect in kidney function (Bloh *etal* ., 2022). Several studies have shown that urea is involved in the process of atherosclerosis in patients with CRF, stimulating endothelial dysfunction, aging, and increased susceptibility to apoptosis, each of which is involved in the development of atherosclerosis. High levels of urea stimulate Insulin resistance and impairs insulin secretion in the pancreas, which may contribute to high rates of cardiovascular disease in patients with CRF(Giardino *etal*,.2017) .blood urea levels can also be affected by several factors such as diet and hydration status, which it can differ between men and women. Men may be more susceptible to certain types of Kidney diseases such as polycystic kidney disease, which can contribute to high levels of creatinine and urea in the blood (Ali and Bazzaz, 2023).

The effect of chronic kidney disease on creatinine concentration 2-3

The results In Table (2) showed that there was a signIficant increase in creatinine for patients of both sexes, as the percentage of increase reached (140%) for males and (138%) for females compared with the control group.

Creatinine is manufactured In the body at a constant rate from creatine that is produced during muscle contraction from creatine phosphate. The creatinine in the blood is then removed by filtration through the glomeruli of the kidneys for excretion in the urine. A high level of creatinine in the serum is associated with kidney disease, importance of creatinine or the level in plasma or serum is usually determined In conjunction with the level of urea in plasma or serum, as there is an increase In both levels and is called Azotemia while the level of the kidney or urine clearance test decreases (Ghazi *etal*. ,2020).

The effect of chronic kidney disease on uric acid concentration 3-3

results In Table (2)showed there was a significant increase In uric acid (45%)for male patients and (83%) for female patients compared to the control group.

Uric acid Is the final product of purine decomposition in humans, but it is metabolized to allantoin via the urea enzyme uricase in other mammals. The level of uric acid in humans is 6.0 mg/dL and is considered one of the powerful antioxidants that represents up to 60% of the antioxidant capacity in human blood plasma. Uric acid exert antioxidant effects by splits free radicals and mineral ion imbalance. It is known that uric acid exerts a protective effect against neurodegenerative diseases such as Parkinson's and Alzheimer's. Uric acid acts as an antioxidant For oxidation only In the hydrophilic environment of biological fluids, especially in the presence of Ascorbic acid (Jung *etal*., 2020).

Hyperuricemia is defined as an elevated serum uric acid level ,usually greeater than 6 mg/dl in women and 7 mg/dl in men(Barkas *etal*.,2018).hyperuricemia is results from increase uric acid production ,decreased excretion ,or a combination of both processes .Dietary purines are responsible for about one- third of the bodys daily serum uric acid production ,the rest is synthesized from endogenous sources. (Song *etal*.,2021)Elevated uric acid production can also seen with accelerated purine degradation in high cell turn over state such as hemolysis,rhabdomyolysis,tumor lysis and decreased excretion (genetic disorder,renal insufficiency,metabolic syndrome).about two-thirds of uric acid is excreted through the kidney and one –third through the gastrointestinal tract.these prooirtion can change depending on medications or dysfunction in the renal or GI system.(Broghi *etal*.,2015)

The effect of chronic kidney disease on albumin 3-4

%Low	%dec	%con	Patient female	Control female	%dec	%con	Patient male	Control male	Parameters
			Mean± Stander deviation	Mean± Stander deviation			Mean ± Stander deviation	Mean± Stander deviation	
	26	73	0.10±3.90* b	0.15±5.33* a	32	67	0.64±3.56* b	0.11±5.28* a	Albumin mg/dL

Table (3) The effect of chronic kidney disease on albumin .

The results In Table (3), showed a decrease in albumin levels(32%)in male and(26%) in female in comparsion with control group .decrease in albumin level in the cases of chronic kidney disease, which is caused by kidney damage that leads to the passage of proteins through the kidney filtration , which leads to a decrease in the concentration of albumin in the serum and the escape of proteins from the blood into the urine. In the case of present damage to the kidney filters, which are called glomeruli in a healthy person, the urinary ducts reabsorb the protein after It passes through the renal glomeruli in small quantities. If it is not absorbed from the urinary ducts, it is eliminated, which leads to a decrease in albumin levels In the blood Ogden *etal*., 2015) A decrease in the concentration of albumin in the serum also (A occurs as a result of decreased synthesis or increased catabolism, such that the protein is considered a negative reactant in the acute phase. Therefore, a decrease in the concentration of albumin in the blood has been associated with an increased risk of death in patients with acute diseases. Patients with chronic kidney disease (CKD) often have a decrease In the concentration of albumin in the serum. In serum albumin level (Reynolds *etal*., 2006).

Studies have shown that 50% of the calcium In plasma is bound to albumin. When the calcium concentration decreases, albumin decreases. Occour a loss of (6-12) gm of amino acids, (2-3)gm of peptides, and a small amount of proteins(Krenitsy,2004).

These results are consistent with an Australian study that showed that serum albumin is associated with an annual decrease in glomerular filtration rate (GFR) and renal outcomes in patients with chronic kidney disease, according to sex, urine albumin, triglycerides, age, diabetes, CRP, total cholesterol, body mass Index, and blood consumption. Alcohol . They found that each additional gram/L increase in albumin could lead to a decrease in glomerular filtration rate 0.31 ml/min/1.73 m2/year (Orlandi *etal*., 2018; 2021, Song *etal*).

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