

Study Some Haematological And Biochemical Parameters in Patients with Renal Failure in Diyala Province

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Abstract

Current study was happened in Baqubah province for kidney failure patients (in Ibn Sina Center) for dialysis in Baqubah teaching hospital and started from September (2016) to march (2017). (100) samples of blood collected from patients of renal failure, males number (61) and females (39) with age range (10–88) years and collected (50) samples of blood from healthy individual have been accredited as group control , males number (25) and females (25) with age range (10–88) years . Result of current study appeared that the ratio of disease rate among males (61%) than females (39%) with no significant different between groups ($P>0.05$). Result of biochemical parameters expressed increased levels of B.urea, and S.creatinine For patients when compared with control with significant different between groups ($P<0.05$), so uric acid was raised For patients when compared with control but with no significance different between groups ($P>0.05$), either albumin and total protein parameters were lowest For patients when compared with control with significance different between groups ($P<0.05$). The hematological parameters (HB, PCV, WBC and PLT) result were noticed decreased For patients when compared with control with significance different between groups ($P<0.05$). The conclusions of our study showed the percentage of male patients are more than female, age periods (31-50 and 51-70) years have high percentage of patients, low levels of all hematological parameters (HB, PCV, PLT and WBCs) in patients than controls, high levels of biochemical parameters (B. urea, S.creatinine, Uric acid) in patients than controls, while (Albumin and protein) were low in patients than controls. The aim of current study is detecting hematological and biochemical parameters changes in patients with Renal failure in Baqubah province.

Key words: renal failure, biochemical parameters, hematological parameters.

Introduction

Acute renal failure appear a rapid losing in renal function leading to kidney function loss resulting and increased nitrogenous waste in blood and fluid balance. Is a common threat to people with serious illnesses in intensive care units, in addition to the mortality rate of 42% to 88% [1]

Renal failure is the kidney's inability to remove metabolic end products from blood and dysregulation on fluid, electrolytes, and pH balance of fluids. It may be the cause of kidney disease, urinary tract defects of a non-ethnic origin, or systemic diseases and kidney failure is divided into acute or chronic. Acute renal failure is reversible damage of kidney that may be treated.[1][2]

Millions People are affected by non-fatal kidney disease, urinary tract infection, blockage and kidney stones are considered to be the most important diseases observed in the kidneys. Up to 20% of all women have urinary tract infections at some time in their lives and at least 1% of patients develop kidney stones [3]. Chronic kidney disease (CKD) is a syndrome characterized by gradual and irreversible deterioration of kidney function due to the slow destruction of the kidney weft and consists of a wide range of different physiological pathological processes, which are associated with chronic renal failure, and eventually ends in death when adequate numbers of the Nephrons. Acidosis is the main problem in CRF with the development of biochemical asymptomatic and clinical uremia syndrome. Normal

renal function and progressive reduction of glomerular filtration rate (GFR) [4] [5]

Kidney disease is associated with many hematological changes. Anemia is similar to the degree of renal insufficiency and the most important reason is the failure of renal erythropoietin secretion. In addition to chronic blood loss, blood dissolution and bone marrow fracture through retained uremic factors [6]

The aim of current study is detecting hematological and biochemical parameters changes in patients with Renal failure in Baqubah province.

Material and methods

Current study was happened in Baqubah provice for kidney failure patients (In Ibn Sina Centr) for dialysis in Baqubah teaching hospital and started from September (2016) to march (2017). (100) samples of blood collected from patients of renal failure, males number (61) and females (39) with age range (10–88) years and collected (50) samples of blood from healthy individuals have been accredited as group control , males number (25) and females (25) with age range (10–88) years. Collected 5 ml of blood and it was left at room temperature 20-25°C to allow it to clot, then the sera was separated by centrifugation for (5-10) minutes, and sera

divided into three tubes (250 µl) and stored at -20°C still examination.

Parameters of current study

1- Hematological parameters

The hematological parameters (HB, PCV, PLTs and WBCs) were measured by Complete Blood Count (CBC) system.

2- Biochemical parameters

The Biochemical parameters (B. urea, S. creatinine, Uric acid. Albumin and protein) were measured by Cobas 400.

Statistical Analysis

Chi-squared and T test are method used to analysis of current data, a level of significance of P<0.05 was applied to test, the statistics software used to process the data analysis were the (SPSS v.22)[7].

Results and discussion

Results of current study showed the percentage of males more than females with non-significant difference between sex as well as two groups p>0.05 and shown as in table (1).

Table (1) distribution of study groups according to sex.

		Study group	
		Control	Patients
Gender	Male	25	61
	%	50 %	61 %
	Female	25	39
	%	50 %	39 %
Total		50	100
p value		No Sig. (p>0.05)	

Results of current study show that the percentage of males with renal failure more than females and reasons of it may be due largely to the daily effort after exposed then women, large number of protein consume by men than women, in addition to that muscle mass in men than women leads to increase concentration of creatinine in men [8]. In addition, result of current study were compatible with results conducted by [9].

In current study the age range of renal failure patients were 10-88 years as shown in table (2). Also the current study results showed that the age periods 10-30 and >70 years recorded lowest rate of disease, while the age period 31-50 and 51-70 years recorded highest rate of disease. The age of control group range between 10-88 year and divided into groups, and found significant different between groups $P < 0.05$ as shown in table (2).

Table (2) distribution of study groups according to age periods.

		Study group	
		Control	Patients
Age groups	10-30 years	15	11
	%	30%	11%
	31 -50 years	15	32
	%	30%	32%
	51-70 years	15	47
	%	30%	47%
	>70 years	5	10
	%	10%	10%
Total		50	100
p value		Sig. (p<0.05)	

Moreover, results of current study were agree with results that conducted by [10]. Chronic kidney diseases (CKD) are commonly in elderly [11] and this is why the professional organizations to conduct routine tests for older people in health care centre [12]. The individuals have >55 year are more susptible to renal failure disease as compared to young [13]. The age group associate with glomerular filtration rate (GFR), the elderly groups have low (GFR) than young groups [14]. So it will be that, percentage of death for patients with kidney failure patients elderly more than young [15].

In current study we measured the haematological parameters in patients and control. Notice decrease all haematological parameters in patients than control, where the concentration of HB and PCV were low in patients (9.38 ± 1.85 g/dl and 28.54 ± 5.30 %) than control (13 ± 0.69 g/dl and $44.78 \pm 5.9\%$) respectively with high different significant ($P < 0.05$). Also, the current study show decrease concentration of WBC and PLT in patients (6120 ± 2663.93 cell/ml and 211.23 ± 90.86 cell/ml) than control (7607.72 ± 2557.43 cell/ml and 278.7 ± 99.24 cell / ml) respectively with high different significant ($P < 0.05$) as shown in table (3).

Table (3) comparison haematological parameters between study groups.

Parameters		Number	Mean	S.D	P. Value
HB g/dl	patient	100	9.38	1.85	Sig. (p<0.05)
	control	50	13	0.69	
PCV %	patient	100	28.54	5.30	Sig.(p<0.05)
	control	50	44.78	5.9	
WBC cell / ml	patient	100	6120	2663.93	Sig.(p<0.05)
	control	50	7607.72	2557.43	
PLT cell / ml	patient	100	211.23	90.86	Sig.(p<0.05)
	control	50	278.7	99.24	

This study was agreed with studies [18] and [19] which are includes low levels (HB and PCV) in patients with renal failure when compared with control group.

In the present study all the patients had anemia with hemoglobin values 9.38 g/dl. Most studies in literature state that uremic patients are almost invariably anemic [18]. Anemia of the chronic renal failure is multifactorial. The pathogenesis of this type of anemia has been attributed to decreased plasma erythropoietin due to renal damage, inhibitors of erythropoiesis in uremic plasma and decreased hemoglobin oxygen affinity [20]. In addition to damage to renal site of erythropoietin production, plasma erythropoietin and erythropoiesis is further suppressed in patients with renal disease. The stimulus to erythropoietin production is less intense than in patients with comparable severe anemia due to other causes. This is because the affinity of oxygen decreases which increases the availability of oxygen per unit of hemoglobin circulating through kidney [20].

In current study WBCs was low in patients than controls and this low was agree with study [21]. Low causes of WBCs in patients with renal failure includes:-

1- Leukocytopenia is related to inflammation.

2- High concentration of pro-inflammatory cytokines and specially TNF- α which lead to inhibition leukocytosis [21].

In addition, PLTs levels were low in current study and our study was agree with study [22] that refer two

decreases levels of PLTs in patients with renal failure.

Platelets circulate in the blood of mammals and participate in blood clotting which leads to the formation of blood clots. Thrombocytopenia plays a major role in blood clot events, especially in the identification of heart disease and atherosclerosis in patients with end-stage renal failure [23].

In current study we measured the biochemical parameters in patients and control. Notice increase some biochemical parameters (B. sugar, B. Urea, Creatinine , Uric acid) in patients than control, and decrease protein, Albumin . The concentrations of B. Urea were high in patients (102.65 ± 42.98 mg /dl) than to control (31.48 ± 9.73 mg /dl) respectively with high different significant ($P < 0.05$). so The concentrations of Creatinine was high in patients (5.75 ± 2.09 mg /dl) than to control (0.84 ± 0.39 mg /dl) with high different significant ($P < 0.05$). also, notice high concentration of Uric acid in patients (5.5 ± 1.89 mg /dl) than to control (5.31 ± 1.64 mg /dl) respectively with no different significant ($P > 0.05$). while the protein and Albumin were low in patients (63.62 ± 8.71 g /dl and 36.16 ± 6.28 g /dl) than to control (70.92 ± 5.92 g /dl and 44.52 g /dl ± 6.36 g /dl) with high different significant ($P < 0.05$). as shown in table (4).

Table (4) comparison biochemical parameters between study groups.

Parameters	groups	NO.	Mean	SD	P value
B. Urea mg /dl	patient	100	102.65	42.98	Sig.(p<0.05)
	control	50	31.48	9.73	
Creatinine mg /dl	patient	100	5.75	2.09	Sig.(p<0.05)
	control	50	0.84	0.39	
Uric acid mg /dl	patient	100	5.5	1.89	Sig.(p<0.05)
	control	50	5.31	1.64	
protein g /dl	patient	100	63.62	8.71	Sig.(p<0.05)
	control	50	70.92	5.92	
Albumin g /dl	patient	100	36.16	6.28	Sig.(p<0.05)
	control	50	44.52	6.36	

This study is agreed with the researchs [24] which are includes high levels (Uric acid and S.urea) in patients with renal failure when compared with control group. the hemodialysis which diabetic dialysis patients ,they are more likely to develop cardiovascular disease compared with non-diabetic dialysis patients.

The results show that an increase urea level in in serum blood for patient with hemodialysis when compared with control group ,may be due to the urea is the first organic solute detected in the blood of Patients with renal failure had the most significant quantified melanin secreted by kidneys in patients. However, however, we need many research showing signs and symptoms of uremic recurrence by raising levels of soluble in patients with polina [25].

On other side result of study Urinary symptoms in patients were found to be alleviated by initiation of renal dialysis, even when urea was added to the aura to maintain the level of nitrogen in the blood at about 90 mg per deciliter [26].

The result show high level in serum creatinine for patient with renal failure when compared with control group. creatinin is an excreting substance that is produced in creatin metabolism in a nonenzymatic pathway. High level in creatinine and urea may be due to pre renal or

post renal disorders [27].

Our study had several important limitations. Glomerular filtration rate (GFR)is of diseases which are based on serum creatinine however, they can potentially lead to over diagnosis of chronic kidney disease [28].

In dialysis patients low serum creatinine is a marker for protein-energy wasting, which is a strong predictor of anemia and mortality in renal transplant recipients [29]. A diagnostic test to assess kidney function is used to Determination of serum creatinine. [30] show The doctors rely on plasma concentrations of waste materials from creatinine and urea. These tests are sufficient to determine whether a patient is suffering from kidney disease and help to measure the efficiency of the kidneys in filtering the blood. It also gets the amount of nitrogen and creatinine in the blood increase.

GFR is used to show how determine the stage of renal disease and guide decisions about treatment and the renal function of the patient still has. [3] Renal renal failure is caused by conditions that damage structures within the kidney - glomerular, interstitial or tubular. More common injury than common tubes is toxic in origin or ischemia. That ischemia associated with clinical failure and obstruction within the nucleus. The toxic abuse of tubular structures, acute glomerulonephritis,

acute erythema and kidney disease are the major causes of kidney failure [31].

On other hand high level in serum uric acid may be to development of renal dysfunction, a potential mechanism by U.A. Kidney disease may be exacerbated by activation of the renin angiotensin system (RAS). Research has found that RAS plays a role in worsening kidney disease by increasing the level of glomerular and systemic pressure, in addition to its direct cause of cirrhosis and damage to blood vessels and renal cells. In the early stages of hypertension that causes an increase in U.A leads to a decrease in renal blood flow which in turn causes a change in the balance between the turnover of the spinal cord and the cortical cycle, which may lead to a decrease in urate secretion [23].

A new approach toward the prophylaxis and treatment of uric acid nephropathy is the enzyme uricase, which catalyze station of uric acid causing mechanical obstruction, direct toxicity to endothelial cells and epithelial, and potentially activation of the innate immune system.[27]

In this study the results show decreased signification in albumin level in patients with renal failure. This result is a gree with [34] and [33]. The effects of nutritional status and inflammatory association with the number of deaths in dialysis patients [20] and some studies show albumin level relationship increased 47% in the risk of death. The increase in death risk was partially explained by the inflammatory pathway. The albumin is negative in the acute negative phase, and the level of albumin in the serum is strongly affected by the presence of inflammatory, serum albumin measurements in patients with dialysis patients can not accurately assess dialysis patients

[34] show Decrease in serum albumin levels may be associated with increased blood viscosity and hypercoagulable states [28] The albumin plays an important role as a free radical activator, a carrier of a wide range of drugs, hormone and binding agent for toxic compounds. The mucosal pressure may negatively affect fluid transfer between interstitial space and intracellular vacuum. [29]. On other hand the results show the total serum protein decreased signification in patients renal failure when compared with control group ,the concentration in total protein because of ultrafiltration

, which leads to is low protein binding which tend to decrease further during dialysis and peculiar behavior of hip uric acid .[30][31]

Conclusions

The conclusions of our study showed:-

- 1- The percentage of male patients are more than female.
- 2- Age periods (31-50 and 51-70) years have high percentage of patients.
- 3- Low levels of all hematological parameters (HB, PCV, PLT and WBCs) For patients when compared with control.
- 4- High levels of biochemical parameters (B. urea, S.creatinine, Uric acid) For patients when compared with control , while (Albumin and protein) were low For patients when compared with control.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Bilad Alrafidain University College and all experiments were carried out in accordance with approved guidelines.

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