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Research Article

The Significant Role of Demographical Features, Clinical Implications, and Laboratory Investigations in the Diagnosis of Kidney-Hemodialysis Patients.

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Abstract

Hemodialysis is the most common method used to treat advanced and permanent kidney failure. Anemia in end stage renal disease is almost universal. It can be caused by erythropoietin deficiency, blood loss, iron deficiency, shortened red cell life span, vitamin deficiencies, the "uremic milieu," and inflammation.

The aim of this study was to diagnose patients with kidney dialysis according to hematology finding, biochemistry test with the present clinical symptoms, which will change in patients with kidney failure in various value. Also to know the differences between these values and the normal value. And to know the differences between the values of male and female present with kidney dialysis.

A cross-sectional study of single center collected from Basrah General Hospital-dialysis unit, the study included 100 hemodialysis patients, 60 patients of them were male and 40 patients were female. The data was about age, gender, residency, occupational status, chemotherapy (drug taking), dialysis causes, hematology finding and biochemical test (serum test).

Keyword: Demography, Clinical, Laboratory, Acute and Chronic Failure, High Hemodialysis Blood Potassium.

Introduction

Kidney failure, also known as end-stage kidney disease, is a medical condition in which the kidneys are functioning at less than 15% of normal levels [1]. Kidney failure is classified as either acute kidney failure, which develops rapidly and may resolve; or chronic kidney failure, which develops slowly and can often be irreversible [2]. Symptoms may include leg swelling, feeling tired, vomiting, loss of appetite, and confusion [1]. Complications of acute and chronic failure include uremia, high blood potassium, and volume overload [3]. Renal Failure and Replacement Therapies). Complications of chronic failure also include heart disease, high blood pressure, and anemia [4]. Causes of acute kidney failure include low blood pressure, blockage of the urinary tract, certain medications, muscle breakdown, and hemolytic uremic syndrome [2]. Causes of chronic kidney failure include diabetes, high blood pressure, nephritic syndrome, and polycystic kidney disease [1]. Diagnosis of acute failure is often based on a combination of factors such as decreased urine production or increased serum creatinine [3]. Renal Failure and Replacement Therapies). Diagnosis of chronic failure is based on a glomerular filtration rate (GFR) of less than 15 or the need for renal replacement therapy [5]. It is also equivalent to stage 5 chronic kidney disease [5]. Kidney failure can be divided into two categories: acute kidney failure or chronic kidney failure. The type of renal failure is differentiated by the trend in the serum creatinine; other factors that may help differentiate acute kidney failure from chronic kidney failure include anemia and the kidney size on sonography as chronic kidney disease generally leads to anemia and small kidney size. Treatment of acute failure depends on the underlying cause [6]. Treatment of chronic failure may include hemodialysis, peritoneal dialysis, or a kidney transplant [1]. Hemodialysis uses a machine to filter the blood outside the body [1]. In peritoneal dialysis specific fluid is placed into the abdominal cavity and then drained, with this process being repeated multiple times per day [1]. Kidney transplantation involves surgically placing a kidney from someone else and then taking immunosuppressant medication to prevent rejection [1]. Hemodialysis, or simply dialysis, is a process

of purifying the blood of a person whose kidneys are not working normally. This type of dialysis achieves the extracorporeal removal of waste products such as creatinine and urea and free water from the blood when the kidneys are in a state of kidney failure. Hemodialysis is one of three renal replacement therapies (the other two being kidney transplant and peritoneal dialysis). An alternative method for extracorporeal separation of blood components such as plasma or cells is apheresis. Hemodialysis often involves fluid removal (through ultrafiltration), because most patients with renal failure pass little or no urine. Side effects caused by removing too much fluid and/or removing fluid too rapidly include low blood pressure, fatigue, chest pains, leg-cramps, nausea and headaches. These symptoms can occur during the treatment and can persist post treatment; they are sometimes collectively referred to as the dialysis hangover or dialysis washout. The severity of these symptoms is usually proportionate to the amount and speed of fluid removal. However, the impact of a given amount or rate of fluid removal can vary greatly from person to person and day to day. These side effects can be avoided and/or their severity lessened by limiting fluid intake between treatments or increasing the dose of dialysis. Hemodialysis is the choice of renal replacement therapy for patients who need dialysis acutely, and for many patients as maintenance therapy. It provides excellent, rapid clearance of solutes [7]. Chronic kidney disease (CKD) is a type of kidney disease in which there is gradual loss of kidney function over a period of months to years [2]. Initially there are generally no symptoms; later, symptoms may include leg swelling, feeling tired, vomiting, loss of appetite, and confusion [8].Complications can relate to hormonal dysfunction of the kidneys and include (in chronological order) high blood pressure (often related to activation of the Renin Angiotensin-Aldosterone system), bone disease, and anemia [4,9,10]. Additionally CKD patients have markedly increased cardiovascular complications with increased risks of death and hospitalization [11]. Causes of chronic kidney disease include diabetes, high blood pressure, glomerulonephritis, and polycystic kidney disease [2, 12]. Risk factors include a family history of chronic kidney disease [8]. Diagnosis is by blood tests to measure the estimated glomerular filtration rate (GFR), and a urine test to measure albumin [13]. Ultrasound or kidney biopsy may be performed to determine the underlying cause [2]. Several severity-based staging systems are in use [14, 15].

Acute kidney injury (AKI), previously called acute renal failure (ARF), [16,17], is a rapidly progressive loss of renal function, [18], generally characterized by oliguria (decreased urine production, quantified as less than 400 mL per day in adults, [19], less than 0.5 mL/kg/h in children or less than 1 mL/kg/h in infants); and fluid and electrolyte imbalance. AKI can result from a variety of causes, generally classified as prerenal, intrinsic, and post renal. Many people diagnosed with parquet intoxication experience AKI, sometimes requiring hemodialysis.[citation needed] The underlying cause must be identified and treated to arrest the progress, and dialysis may be necessary to bridge the time gap required for treating these fundamental causes.

Materials and Methods

Kidney hemodialysis diagnosis in this study (cross-sectional study) which is single center study that was collected in Basrah province particularly in Basrah General Hospital-Dialysis Unit, and conducted between January to May, 2022, the aim of this study to diagnose patients with kidney dialysis according to hematology parameters, biochemistry test and electrolyte distribution with the present clinical symptoms. During samples collection process all medical information of all patients (which their total number were 100 patient with age group range from 10 >90 year) were recorded in questionnaire paper that included: name, gender, age, residency, occupational status, chemotherapy (drug taking), dialysis causes, hematology test and biochemistry test (serum test), in addition clinical findings which involve the most frequent symptoms related with kidney failure and kidney dialysis, and some other information were absent from patients profile. Microsoft Excel version 2010 was used to analyze data of all patients.

Statistical analysis

Statistical analysis was carried by using SPSS VER.23 two way T-test (student's test) to find out (p-value) the statistical differences between all variables. Probability less than 0.05 is significant ($P<0.05$).

Results

The total number of hemodialysis patients involved in this study are (100) individual were taken from hemodialysis unit in Basra General Hospital, 60%of them are male while 40%of them are female. Age group of male ranging between (10-90) years, most of them age group ranging between (40-60) years. While in female age group ranging between (10-70) years and the most that are presenting with kidney dialysis were of age group ranging between (30-60) years. 40% of male reside in the central of Basra and 60%of them reside in the peripheral of Basra. While in female 45% of them reside in the central of Basra and 55%of them reside in the peripheral of Basra. All female in the study was house wife while most of male was worker. We notice that the most common causes of renal failure in both sex was CKD (chronic kidney disease). The common drugs used are Eprex v (epoetin alfa), one Alfa cap (Alphacalida) and Heparin for male and female. The blood tests for hemodialysis patients generally shows low number of red blood cells and anemia in those patients. The data of all patients were used to build up several general classification model for kidney dialysis. The system offer an effect summary that examine each demographic factors and serum test that have an importance across multiple diagnosis.

Distribution of patients According to gender

Table -1- document that most of the patients of renal dialysis was male with percentage of 60%, while female is 40% of the total number patients, with p-value = 0.0521 which is not significant.

Table (1): Distribution of hemodialysis patients According to gender.

Gender	No.	%	p-value#
Male	60	60%	0.0521 Not significant
Female	40	40%	
Total	**100**	**100%**	

p: probability

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Distribution of patients According to residency

Table (2)- document that most of the patients reside in the peripheral of Basra with percentage of 60% for male and 55% for the female while patients reside in the central of Basra reside 40% for male and 45% for female, with p-value = 0.0521 which is not significant.

Table (2): Hemodialysis patient's residency modes

Residency	Male		Female		p-value#
	No.	%	No.	%	
Central	24	40%	18	45%	0.0583 Not significant
Peripheral	36	60%	22	55%	
Total	**60**	**1**	**40**	**1**	

P: probability

Distribution of patients According to age groups

Table (3)- document that most male with renal failure is between age group (50-60)years with percentage of 33.30%, then male with (60-70)years with percentage 25%,then (40-50) years with percentage of 13.30%,then (10-20)years and (20-30)years with percentage of 6.70% and lastly age group between (30-40)years and (7080)years and (80-90)years all with percentage of 5%, with p-value = 0.0583 which is not significant.

Table (3): Prevalence of hemodialysis patients According to age groups.

Age Groups (year)	Male		Female		p-value#
	No.	%	No.	%	
10 – 20	4	6.70%	2	5.00%	0.0673 Not significant
21 – 30	4	6.70%	4	10.00%	
31 – 40	3	5.00%	7	17.50%	
41 – 50	8	13.30%	8	20.00%	
51 – 60	20	33.30%	9	22.50%	
61 – 70	15	25.00%	8	20.00%	
71 – 80	3	5.00%	2	5.00%	
81 - 90	3	5.00%	0	0.00%	
Total	**60**	**100.00%**	**40**	**100.00%**	

P: probability

Distribution of patients According to occupational status

Table (4)- document that most of the male patients are free worker with percentage of 40%, and then the employer with percentage of 11.66%, then retired with percentage of 6.66%, then District Mukhtar with percentage of 3.33%, and lastly policeman with percentage of 1.66%,while all female patients in the study are house wife, with p-value = 0.0483 which is significant.

Table (4): Occupational status among hemodialysis patients.

Occupational Status	Male		Female		p-value#
	No.	%	No.	%	
Free Worker	24	40%	0		0.0483 Significant (P<0.05)
Employer	7	11.66%	0		
District Mukhtar	2	3.33%	0		
Policeman	1	1.66%	0		
Retired	4	6.66%	0		
Housewife	0	0%	27	67.50%	
Total	**38**	**63%**	**27**	**67.50%**	

P: probability

Drugs used by hemodialysis patients

Table (5)- document that most dugs used by male patients are Eprex v (Epoetin) and One Alfa cap (Alphacalida) and Heparin with percentage of 27%,then Sevelamer tap with percentage of 11%, then Venofer amp (Iron sucrose) with percentage of 7.14%,then Paracetamol vial with percentage of 1.78%.in female the most common drugs used are Eprex v (Epoetin) and One Alfa cap (Alphacalida) with percentage of 30%,then Heparin with percentage of 22%,then Sevelamer tap with percentage of 8%,then Venofer amp with percentage of 5%and less one used are Paracetamol vial and Triplixam with percentage of 3%, with p-value = 0.0431 which is significant.

Table (5): Drugs intake by hemodialysis patients.

Drugs	Male		Female		p-value#
	No.	%	No.	%	
Eprex V (Epoetin Alfa)	15	27%	11	30%	0.0431 Significant (P<0.05
One Alfa cap (Alphacalida)	15	27%	11	30%	
Sevelamer tab	6	11%	3	8%	
Heparin	15	27%	8	22%	
Triplixam	0	0%	1	3%	
Paracetamol vial	1	1.78%	1	3%	
Venofer amp (Iron sucrose)	4	7.14%	2	5%	
Total	**56**	**100%**	**37**	**100%**	

P: probability

Clinical causes of hemodialysis patients

Table (6)- document that the most common causes of renal failure in male is CKD(chronic kidney disease) with percentage of 54.54%, then UTI(urinary tract infection) with percentage of 18.18%,then kidney stones and other unknown causes with percentage of 9.10%,then polycystic kidney syndrome and kidney failure due to accident with percent-

age of 4.54%,and in female also the most common causes of renal failure is CKD (chronic kidney disease) with percentage of 31.60%,then diabetes mellitus with percentage of 26.32%,then drugs induced kidney failure with percentage of 10.52%, while kidney stones and SLE(systemic lupus erythematous and polycystic kidney disease and UTI (urinary tract infection) and auto immune disease and other unknown causes each of them take percentage of 5.26%, with p-value = 0.0493 which is significant.

Table (6): Clinical causes of hemodialysis patients.

Dialysis Causes	Male 60		Female 40		p-value#
	No.	%	No.	%	
CKD (Chronic Kidney Disease)	12	54.54%	6	32%	0.0493 significant (P<0.05).
Kidney Stones	2	9.10%	1	5.26%	
SLE (systemic lupus erythematous)	0	0.00%	1	5%	
DM (Diabetes mellitus)	0	0.00%	5	26.32%	
Polycystic Kidney syndrome	1	4.54%	1	5%	
Kidney failure due to accident	1	4.54%	0	0.00%	
Drug induced Kidney failure	0	0.00%	2	10.52%	
UTI (urinary tract infection)	4	18.18%	1	5.26%	
Auto-immune disease	0	0.00%	1	5%	
Unknown diagnostic cause	2	9.10%	1	5.26%	
Total	**22**	**100.00%**	**19**	**100.00%**	

P: probability

Hematological finding among hemodialysis patients

Table (7) - document that the average number of WBC (white blood cells) for both sexes are within the normal range which is 7.32×10^3/micro liter for male patients and 6.94×10^3/micro liter for female patients, with value = 0.062 which is not significant. While the average number of RBC (Red blood cells) for both sexes are lower than the normal range which is 3.18×10^6/ micro liter for male patients and 3.23×10^6/micro liter for female patients, with p-value = 0.0736 which is not significant. Also the mean of hemoglobin levels for both sexes are lower than the normal range which is 8.48g/dl for male patients and 8.42 g/dl for female patients, with p-value = 0.0651 which is not significant. The mean of MCV value for both sexes are within the normal range which is 78.85 FL for male patients and 79.31 FL for female patients, with p-value = 0.0712 which is not significant. Also the mean of MCH for both of sexes are within the normal range which is 26.7 pg for male patients and 26.74 pg. for female patients, with p-value = 0.0531 which is not significant.

The mean of PLT (platelets count) for both sexes are also with in the normal range which is 220.55×10^3 /micro liter for male patients and 242.18×10^3/micro liter for female patients, with p-value = 0.0694 which is not significant. The mean of lymphocytes count for both sexes are within the normal range which is1.5×10^3/micro liter for male patients and 1.54×10^3/micro liter for female patients, with p-value = 0.0637 which is not significant. The mean of neutrophils count for both sexes are also within the normal range which is 5.12×10^3/micro liter for male patients and 4.48×10^3/micro liter for female patients, with p-value = 0.0561 which is not significant. And lastly the mean of MXD# value for both sexes are also within the normal range which is 0.75×10^3 /micro liter for male patients and 0.79×10^3/micro liter for female patients, with p-value = 0.0732 which is not significant.

Table (7): Hematological finding among hemodialysis patients.

Hematology	Male		Female		Unite	p-value#
	Mean	Reference Value	Mean	Reference Value		
WBC (Leukocyte)	7.32	4.0 - 10.0	6.94	4.0 - 11.0	10^3/µL	0.062*
RBC (Erythrocytes)	3.18	3.5 - 5.5	3.23	3.50 - 5.00	10^6/µL	0.0736*
HGB (Hemoglobin)	8.48	11.5 - 16.5	8.42	11.0 - 14.0	g/dL	0.0651*
MCV	78.85	75 - 100	79.31	80.0 - 100.0	fL	0.0712*
MCH	26.7	25 - 35	26.74	27.0 - 34.0	pg	0.0531*
PLT (Platelet Count)	220.55	130 - 400	242.18	150 - 400	10^3/µL	0.0694*
LYM (lymphocyte)	1.5	0.5 - 5	1.54	0.8 - 4.0	10^3/µL	0.0637*
NEUT(neutrophil)	5.12	1.4 - 6.4	4.48	2.0 - 7.0	10^3/µL	0.0561*
MXD# (mixed)	0.75	0.1 - 1.5	0.79	0.1 - 1.5	10^3/µL	0.0732*

P: probability *: not significant

Biochemical parameters among hemodialysis patients

Table (8)- document that the mean of s. ferritin for both sexes are within the normal range for both sexes which is 351.223 ng/ml for male patients and 283.477 for female patients, with p-value = 0.0793 which is not significant. PTH (parathyroid hormone) value also within the normal range for both sexes which is 141.564 ng/ml for male patients and 231.678 ng/ml for female patients, with p-value = 0.0683 which is not significant. In other hand the mean of vitamin D value is lower than the normal range for both sexes which is 19.274 ng/ml for male patients and 16.466 ng/ml for female patients, with p-value = 0.0532 which is not significant.

Table (8): Biochemical parameters among hemodialysis patients

Test name	Male	Female	Normal range	Unite	p-value#
Serum Ferritin	351.223	283.477	25-400	ng/ml	0.0793*
PTH (Parathyroid hormones)	141.564	231.678	25 ng/ml deficient..... 20-30 ng/ml insufficient..... >30 ng/ml normal	ng/ml	0.0683*
Vitamin D	19.247	16.466	30-100	ng/ml	0.0532*

P: probability. *: not significant

Various Biochemical parameters of hemodialysis patients

Table (9) - document that the mean of ALP2S (Alkaline phosphatase) in male patients which is 106.10 U/L within the normal range, while in female patients the mean is 136.47 U/L higher than the normal range, with p-value = 0.0461 which is significant. The mean of CREJ2 (Creatinine) which is 8.54 mg/dl for male patients and 7.47 mg/dl for female patients higher than the normal range, with p-value = 0.0372 which is significant. Also the mean of UREL (Urea) which is 128.79 mg/dl for male patients and 109.21 mg/dl for female patients higher than the normal range, with p-value = 0.0297 which is significant. The mean of CA2(Calcium) for male patients which is 8.18 mg/dl lower than the normal range while in female patients the mean is 8.06 mg/dl within the normal range, with p-value = 0.0632 which is not significant. The mean of ASTL (Aspartate Aminotransferase) which is 24.74 U/L for male patients and 16.02 U/L for female patients within the normal range, with p-value = 0.0738 which is not significant. Also the mean of ALTL (Alanine Aminotransferase) which is 23.38 U/L for male patients and 12.66 U/L for female patients within the normal range, with p-value = 0.0691 which is not significant. The mean of BILT3 (total Bilirubin) for male patients which is 0.34mg/dl within the normal range while in female patients the mean which is 0.27 mg/dl lower than the normal range, with p-value = 0.0734 which is not significant. The mean of PHOS2 (phosphate) for both sexes which is 5.28 mg/dl for male patients and 4.921 mg/dl for female patients higher than the normal range, with p-value = 0.0492 which is significant. The mean of MG-2(Magnesium) for both sexes which is 0.875mmol/L for male patients and 0.934mmol/L for female patients within the normal range, with p-value = 0.0531 which is not significant. The mean of GLU2U (Glucose) for both sexes which is 135.82 mg/dl for male patients and 119.25 mg/dl for female patients higher than the normal range, with p-value = 0.0414 which is significant. And lastly the mean of ALB2 (Albumin) for both sexes which is 3.50 g/dl for male patients and 3.72 g/dl for female patients within the normal range, with p-value = 0.0681 which is not significant.

Table (9): Median concentrations of various biochemical parameters measured for hemodialysis patients.

Biochemical test	Male	Female	Normal Values	Unit	P-value#
	Median	Median			
ALP2S (Alkaline phosphatase)	106.10	136.47	39 - 117	U/L	0.0461*
CREJ2 (Creatinine)	8.54	7.47	0.5 - 1.3	mg/dl	0.0372 *
UREL (Urea)	128.79	109.21	15 - 40	mg/dl	0.0297*
CA2 (Calcium)	8.18	8.06	8.4- 11.2	mg/dl	0.0632
ASTL (Aspartate Aminotransferase)	24.74	16.02	10 ,- 35	U/L	0.0738
ALTL (Alanine aminotransferase)	23.38	12.66	3 ,- 55	U/L	0.0691
BILT3 (total Bilirubin)	0.34	0.27	0.3 - 1.2	mg/dl	0.0734
PHOS2 (phosphate)	5.28	4.921	2.5 - 4.5	mg/dl	0.0492*
MG-2 (Magnesium)	0.875	0.934	0.75 - 1.0	mmol/L	0.0531
GLU2U (Glucose)	135.82	119.25	75 - 110	mg/dl	0.0414*
ALB2 (Albumin)	3.50	3.72	3.5 - 5.5	g/dl	0.0681

#p: probability *: significant (P<0.05).

Discussion

Chronic Renal Failure (CRF) becomes a great problem throughout the world. It is connected to increased morbidity and mortality and also to decreased quality of life (QoL) in patients compared to the general population [20]. Renal failure is a gradual, progressive and irreversible loss of normal kidney functioning. One of the progressive diseases causing irreversible fall in the glomerular filtration rate further resulting in elevation in values of serum creatinine and blood urea nitrogen values is the chronic renal failure (. AN S Levey R Atkins J Coresh E P Cohen a J Collins K U Eckerd) Hypertension, diabetes mellitus, autoimmune cause etc. forms the most common cause of chronic renal failure. Since it is irreversible in nature and progresses to further severe form with time, with a decline of glomerular filtration rate to 5 to 10 percent with high levels of uremia. (OH MS, the mechanism of urine concentration). In our study when we took gender in these study Table 1 shows that hemodialysis male patients is more than female patients but According to probability value shows that there is no significant difference between renal failure and gender. Regarding residency Table 2 shows that there is no significant difference between residency and gender but there is increased risk of renal failure in peripheral of Basra more than central of Basrah. While Table 3 shows that there is no significant difference between age group of male and female in occurrence of renal failure but it generally shows that there is increases risk of renal failure with age especially with age group (5070) years old. And also we took the occupational status for those patients (Table 4) and noticed that most of the common occupation related to renal failure are free work for male with percentage of 40% while all the female hemodialysis patients in these cross sectional study are house wife These results are similar to other studies done by [21]; Hameed and Brzanji,(2014), their results show that most of the study samples were housewives, free work Is a risk factors for CKD (chronic kidney disease of unknown etiology)which is potentiated by social and economic factors such as extreme poverty, which obligates workers to work in extreme and harsh conditions [22]; [23]; [24]; [25]. Studies in Nicaragua found agricultural fieldworkers to be at greater risk of decline in kidney function as compared with no fieldworkers [26]; [27]; [28]. Factors such as poor hydration, lack of rest breaks, and lack of heat-related illness prevention training, use of clothing or equipment that increases body heat or decreases the efficiency of sweat evaporation, low wages, and lack of sufficient workplace regulation can further complicate heat stress. We also study the drugs used by hemodialysis patients and we noticed that the most common drugs used by those patients are Eprex v (Epoetin), [29], 3 (4) 1077-1083; DOI: https://doi.org/10.2215/CJN.04601007.One Alfa cap (Alphacalida) and Heparin for both sexes with percentage of 27% for each drugs for male patients ,while in female patients Eprex v (Epoetin) and One Alfa cap (Alphacalida) are used with percentage of 30%,then Heparin with percentage of 22%,Eprex v (Epoetin) is a drugs used to treat anemia by stimulation of bone marrow to produce RBC(red blood cells) because in those patients Lower erythropoietin responsiveness is a strong, independent predictor of mortality risk and should be considered when evaluating associations between clinical outcomes and potential prognostic indicators, such as Epoetin alfa dose and achieved hemoglobin values. While One Alfa cap (Alphacalida) which is a synthetic vitamin D analogue are shown in all cases normocalcemia was re-established within 72 hours after discontinuing the drug. No side-effects were

Observed apart from hypercalcemia. The present data demonstrate the long-term beneficial effects of 1 α(OH)D3 in improving clinical symptoms and reversing several biochemical and skeletal abnormalities in patients with chronic renal failure [30].and heparin especially Unfractionated heparin (UFH) is the anticoagulant of choice for most maintenance hemodialysis units in the United States [31]. We asked the patients about the causes of renal failure and most of the cause was CKD (chronic kidney disease) in both sexes with percentage of 54.54% for male patients and 31.60% for female, patients we also found other causes like UTI (urinary tract infection) and kidney stones for males patients and DM (diabetes mellitus) and auto immune diseases which is common in females than males. Table 6 shows that there is no significant difference between hematological tests and gender but it document that there is decrease in the number of RBC and HGB (hemoglobin) levels in both sexes because of low Erythropoietin due to renal failure, WBC, MCV are within the normal range in both sexes in hemodialysis patients, MCH within the normal range in male but lower than normal range in female patients, platelets, lymphocytes and neutrophils also within the normal range, while MXD higher than the normal range in both sexes. In table (8,9) we took the biochemical parameters of hemodialysis patients and calculate the mean of these test, like alkaline phosphate which we noticed on our cross sectional study that it is within the normal range in the male patients while it was higher than the normal range in female patients and may associated with high motility due to cardiovascular and infection related mortality(Margaret J. Blayney Blayney,...,High alkaline phosphatase levels in hemodialysis patients are associated with higher risk of hospitalization and death). While mean levels of Creatinine and Urea are higher than the normal range due to kidney impairment. These results are similar to other studies done by (Mackenzie Walser; V. U. Collier; M. Walser) and [32]. Means of PHOS2 (phosphate) also higher than the normal range in both sexes these results are similar to other studies done by [33]. Also glucose levels are noticed to be higher than the normal range in both sexes these results are similar to other studies done by [34]. These biochemical changes of the blood reflect the sign and symptoms of the disease. While the other biochemical tests that has been taken by these cross sectional study are not significant between hemodialysis male patients and female patients.

Conclusions

A firm relationship is observed between serum creatinine and serum urea levels among renal failure patients. The four major parameters which is significantly useful in the diagnosis of hemodialysis patients, and they are in high levels, are alkaline phosphatase, urea, creatinine, and glucose. Hemodialysis forms an effective process as an efficient and indispensable process for the filtration of undesired metabolites such as creatinine and urea and electrolytes at a considerable range, hence decreasing burden over kidneys. Serum creatinine and blood urea having significant post dialysis change.

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