Republic of Iraq

ministry of education

&Scientific high Research

Diyala University /college of

Medicine

جمهورية العراق

وزارة التعليم العالي والبحث العلمي

جامعة ديالى / كلية الطب

" Assessment of myocardial dysfunction and Electrolytes Disturbance in patients Undergoing Dialysis at Ibn sina Dialysis Center , Diyala "

This research is submitted to college of medicine, diyala university council as graduation requirements for the 6th year medical 6th students. a part of

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2024/2025

SUPERVISOR CERTIFICATIONS

We hereby certify that the research titled **"Assessment of Myocardial Dysfunction and Electrolyte Disturbances in patients undergoing Dialysis at Ibn sina dialysis center , Diyala ",** prepared by the student(**Ibtihal Dawood Salman**), was carried out under my supervision at the College of Medicine, Diyala University. This research fulfills part of the requirements for obtaining a Bachelor's degree in Medicine.

Academic degree: Pro. Dr. Ismail Ibrahim Latif

Signature:

Date:

Acknowledgment

With heartfelt gratitude and endless praise to Allah, the Most Merciful, for granting me the strength, guidance, and perseverance to complete this journey

To my beloved parents, whose unwavering support, prayers, and sacrifices have been the cornerstone of every achievement in my life. Your love and encouragement inspire To my dear family, and friends, who stood by my side with kindness and me daily motivation, providing the support I needed during challenging times.

To my esteemed professors, whose knowledge, guidance, and mentorship have shaped my understanding and fueled my passion for learning

And finally, to all doctors and patients in Ibn sina dialysis center who contributed, directly or indirectly, to the completion of this work

I dedicate this achievement to all of you with profound appreciation and gratitude. May Allah bless you all abundantly.

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Introduction

Cardiovascular autonomic dysfunction is a significant complication of chronic kidney disease (CKD) and is believed to contribute to the elevated cardiovascular mortality seen in this population. In addition to heightened adrenergic activity, clinical and experimental data increasingly point to a disruption in the reflex regulation of both sympathetic and parasympathetic signals to the heart and blood vessels. While the exact mechanisms remain unclear, factors such as altered baroreceptor, cardiopulmonary, and chemoreceptor reflex functions, alongside increased activity of the renin–angiotensin–aldosterone system, stimulation of renal afferent nerves, and cardiovascular structural changes have been proposed.

The kidneys are essential for maintaining electrolyte and acid-base balance. As kidney function deteriorates in CKD, imbalances in electrolytes and acid-base status inevitably arise, contributing to adverse outcomes. With CKD emerging as a global health crisis, healthcare providers are increasingly faced with managing these complications. Prompt diagnosis and effective .treatment are crucial to reducing complications and can even be life-saving.

1.1 Dialysis

The process of eliminating waste products and excess water from the blood is referred to as dialysis . It serves as an artificial substitute for kidney function, particularly in cases of kidney failure. Although dialysis cannot fully replicate the lost functions of the kidneys, it partially compensates through diffusion and ultrafiltration . Dialysis is typically performed in patients with chronic renal failure (CRF) when the glomerular filtration rate (GFR) drops below 15 ml/min.

CRF is a progressive condition characterized by a gradual loss of kidney function over months or years. It can be diagnosed by measuring serum creatinine levels, a byproduct of muscle protein metabolism. Elevated creatinine levels indicate reduced GFR, a hallmark of CRF . The progression of CRF is divided into five stages based on GFR, with dialysis becoming necessary in stage 5 (GFR < 15 ml/min , also known as end-stage renal disease (ESRD) .

Dialysis helps to remove accumulated toxins from the body but can contribute to oxidative stress due to an imbalance between the excessive production of reactive oxygen species or toxins and the body's weakened defense mechanisms .

Oxidative stress disrupts normal cellular functions, and prior research has shown that CRF may result in elevated plasma urate levels, further

compromising the body's defense systems and exacerbating oxidative stress .

The primary indication for initiating dialysis is impaired kidney function. Conditions such as uremic syndrome, hyperkalemia, extracellular fluid overload, acidosis unresponsive to medical treatment, creatinine clearance of 10 ml/min, and bleeding diathesis (a tendency to bleed due to coagulation .abnormalities) are the main criteria for starting dialysis .

Renal function is evaluated by measuring serum creatinine, blood urea nitrogen (BUN), or by assessing urea and creatinine clearance. Dialysis can be performed using two methods: hemodialysis and peritoneal dialysis. Hemodialysis involves the use of a machine or artificial kidney-like device, while peritoneal dialysis utilizes the peritoneal membrane as a filter. Peritoneal dialysis is often recommended for younger patients due to its flexibility and the option for at-home administration. In contrast, hemodialysis .is typically used for patients with no remaining kidney function.

The Mechanism of Hemodialysis

Hemodialysis removes waste products and excess water from the blood using an external device known as a dialyzer, which contains a semipermeable membrane. Waste removal is achieved by establishing a counter-current flow gradient, where blood flows in one direction and the .dialyzer fluid flows in the opposite direction

Peritoneal dialysis, on the other hand, uses the peritoneum as a natural semipermeable membrane. Waste and excess fluid move into the dialysate, a .solution designed to facilitate the removal process.

Principles of Dialysis

The core principle of dialysis is the diffusion of solute particles across a semipermeable membrane. Metabolic waste products like urea and creatinine move down their concentration gradient from the bloodstream into the dialysate, which typically contains sodium bicarbonate ($NaHCO_3$), sodium chloride (NaCl), acid concentrate, and deionized water. The rate of diffusion depends on the size of the solute particles; larger particles diffuse .more slowly across the membrane

In hemodialysis, an arteriovenous (AV) shunt is created by connecting an artery carrying oxygenated blood to a vein. This strengthens the vein, forming a muscular layer similar to an artery, allowing it to be repeatedly punctured. The pressure within this shunt is carefully monitored throughout the dialysis process.

Blood pressure (BP) is the force exerted by blood against the walls of blood vessels as the heart pumps it, measured using a sphygmomanometer.

In a healthy individual, normal BP is 120/80 mmHg (systolic pressure during heart contraction/diastolic pressure during heart relaxation). A reading of 140/90 mmHg or higher is classified as hypertension . Hypertension increases the pressure of blood flow, potentially damaging blood vessels. When this affects renal blood vessels, it can lead to toxin and fluid accumulation, further raising blood pressure . Hypertension alone is a significant risk factor for kidney disease, and when combined with other complications, it can progress to chronic renal failure.

2.1 Myocardial dysfunction in dialysis (CKD)

Chronic kidney disease (CKD) is a major risk factor for cardiovascular disease (CVD), including coronary artery disease (CAD), heart failure (HF), arrhythmias, and sudden cardiac death (SCD). Patients with CKD face a significantly elevated risk of cardiovascular events, with approximately 50% of individuals in CKD stages 4 and 5 experiencing CVD. Cardiovascular mortality is responsible for 40% to 50% of deaths in patients with advanced CKD. This risk begins to rise when the estimated glomerular filtration rate (GFR) falls below 60–75 mL/min , with a hazard ratio (HR) of 2.5 to 3 for patients in CKD stage 3b, as demonstrated by data from the CKD Prognosis Consortium, which analyzed 629,746 patients.

Similarly, cardiovascular mortality increases with a rise in the urine albumin-creatinine ratio (UACR), showing a significant surge in patients with a UACR exceeding 300 mg/g. Since predicting clinical outcomes in CKD is essential for guiding treatment and patient counseling, the International CKD Prognosis Consortium has developed a calibrated risk assessment tool. This tool uses commonly measured clinical parameters to predict the timing and likelihood of clinical events in patients with severely reduced GFR.

The cardiovascular risk in patients with chronic kidney disease (CKD) is multifaceted, arising from traditional risk factors and comorbidities such as hypertension, dyslipidemia, and diabetes, which are common in this population. Additionally, kidney-specific risk modifiers, including disrupted renal homeostasis, calcium-phosphate metabolism abnormalities, and the accumulation of uremic toxins, contribute significantly. This results in a more complex vascular pathology in CKD, characterized by diffuse macrovascular disease with extensive calcification, larger atherosclerotic necrotic cores, increased plaque rupture, and microvascular dysfunction

Recent research has highlighted differences in atherosclerotic disease progression depending on renal function. Patients with declining kidney

function tend to develop non-calcified lesions, whereas those with stable CKD are more likely to progress with calcified plaques.

Traditional cardiovascular risk calculators often exclude renal function, leading to an underestimation of cardiovascular risk in CKD patients. Consequently, an GFR below 60 mL/min is now considered a cardiovascular risk equivalent, and an GFR below 30 mL/min is regarded as very high cardiovascular risk. This necessitates a comprehensive, multifactorial treatment approach that combines coronary revascularization for select patients with optimal management of hypertension, dyslipidemia, diabetes, and possibly inflammation for all individuals with CKD.

Coronary Artery Disease and Revascularization

Acute Coronary Syndrome

Prompt revascularization is essential in cases of acute coronary syndrome (ACS), whether due to ST-segment elevation myocardial infarction (STEMI) or non-ST-segment elevation myocardial infarction (NSTEMI), regardless of renal function. However, diagnosing ACS in CKD patients can be more complex due to atypical symptoms and the reduced specificity of cardiac biomarkers. For instance, one study reported that only 40% of patients with advanced CKD and acute myocardial infarction presented with chest pain, compared to 61% of non-CKD patients

Additionally, chronic elevations in troponin levels in CKD patients necessitate dynamic changes to identify acute cardiac injury. In a cohort of 2,312 CKD patients without known cardiovascular disease (CVD), 43% exhibited troponin levels exceeding the conventional upper reference limit, rising to 68% in those with an eGFR below 30 mL/min. A decrease of 15 mL/min in eGFR corresponded to a 40% increase in the 99th percentile threshold for high-sensitivity troponin T (hsTnT), reaching 126 ng/L in the CKD cohort. This diagnostic challenge arises because standard assays detect small circulating fragments of cardiac troponin T present in CKD. New assays targeting only long or mildly truncated troponin T forms show promise in improving diagnostic sensitivity in CKD patients with ACS.

Chronic Coronary Syndrome

Diagnosing ischemic coronary artery disease (CAD) in CKD patients is complicated by the reduced sensitivity and specificity of diagnostic tests. This is partly due to prevalent microvascular disease and interstitial myocardial fibrosis, which can obscure the interpretation of myocardial perfusion imaging. In the ISCHEMIA-CKD trial, one in four CKD patients with moderate-to-severe ischemia detected via noninvasive methods was found to

have no obstructive CAD. Furthermore, the study questioned the prognostic value of myocardial perfusion imaging, as it failed to predict death or myocardial infarction.

The extensive vascular calcification, often medial and disproportionate to the severity of obstructive CAD in CKD patients, also diminishes the diagnostic accuracy of computed tomography angiography. Therefore, clinical judgment remains crucial for managing CAD in this population.

Heart Failure

Heart failure (HF) is defined as a syndrome caused by structural or functional cardiac abnormalities that impair the heart's ability to pump blood effectively, leading to symptoms, signs, and objective evidence of cardiac dysfunction. HF can result from either systolic or diastolic dysfunction, is a major cardiovascular complication in patients with chronic kidney disease (CKD), and its prevalence increases as kidney function declines. According to the Atherosclerosis Risk in Communities (ARIC) study, the incidence of HF is three times higher in individuals with an estimated glomerular filtration rate (eGFR) below 60 mL/min compared to those with an eGFR of 90 mL/min or higher. In dialysis patients, the presence of HF at the initiation of dialysis is a significant predictor of both short-term and long-term mortality in patients undergoing either hemodialysis (HD) or peritoneal dialysis (PD). The median survival of dialysis patients with HF at baseline is 36 months, compared to 62 months for those without HF. Moreover, over 80% of end-stage renal disease (ESRD) patients newly diagnosed with HF are expected to die within three years of diagnosis Left ventricular (LV) structural and functional abnormalities are highly prevalent in CKD and ESRD patients. Among ESRD patients starting dialysis, approximately 73.4% exhibit left ventricular hypertrophy (LVH), 35.8% have LV dilation, and 14.8% experience LV systolic dysfunction. LVH typically worsens or does not improve with time on dialysis, and its presence is associated with increased mortality and cardiovascular events, including sudden cardiac death.

The management of patients with both HF and CKD

is often more expensive and fragmented, with frequent referrals between nephrologists and cardiologists. Renin-angiotensin-aldosterone system inhibitors (RAASis), commonly used in HF management, can complicate care due to changes in renal function. This fragmentation often leads to multiple hospital visits and the discontinuation of guideline-directed medical therapy. Multidisciplinary cardiology and nephrology clinics have been proposed as an evidence-based solution to reduce all-cause mortality and show potential for decreasing cardiovascular and all-cause hospitalizations in CKD patients Despite advancements in HF therapy, patients with CKD have not

experienced comparable benefits. β-blockers have demonstrated effectiveness in improving outcomes for patients with heart failure with reduced ejection fraction (HFrEF) across all CKD stages, including dialysis patients. However, studies on RAASis often exclude patients with severe CKD. Angiotensin receptor neprilysin inhibitors (ARNIs) have shown efficacy in trials involving patients with eGFR as low as 20 mL/min. While RAAS inhibitors are beneficial for patients with mild-to-moderate CKD, their use remains limited due to concerns about hyperkalemia and kidney function deterioration.

Cardiomegaly

Cardiomegaly is a common and easily identifiable radiographic finding in patients with congestive heart failure (CHF) and systolic dysfunction. On a chest radiograph, an enlarged heart typically indicates underlying structural cardiac abnormalities, such as left ventricular hypertrophy (LVH), left ventricular dilatation, or both. Although cardiomegaly is not specific for identifying the exact type of structural lesion, its presence holds significant prognostic value in high-risk populations. Epidemiological studies have also demonstrated that heart enlargement, as seen on chest radiographs, is a strong predictor of CHF in the general population. Understanding the prevalence, risk factors, and prognostic implications of cardiomegaly in high-risk groups, particularly among patients with end-stage renal disease (ESRD), could be instrumental in formulating strategies for primary and secondary prevention Structural cardiac disease in ESRD patients is associated with a substantially elevated risk of mortality. Over the past decade, researchers have extensively studied the epidemiology of left ventricular hypertrophy in both ESRD patients and individuals with chronic kidney disease (CKD) who are not yet on dialysis.

The identification of modifiable risk factors has led to several large-scale randomized trials, yielding some successful outcomes. However, cardiomegaly has received comparatively less attention in CKD populations. Since cardiomegaly encompasses both LVH (an indicator of diastolic dysfunction) and left ventricular dilatation (an indicator of systolic dysfunction), its prognostic impact may exceed that of LVH alone Given these considerations, we analyzed the clinical associations of cardiomegaly in a nationally representative sample of newly diagnosed ESRD patients in the United States and assessed its impact on survival outcomes. This approach may provide valuable insights into the role of cardiomegaly in this vulnerable population and support the development of targeted management.

3.1 Electrolytes disturbance

The kidneys play a crucial role in maintaining fluid balance, which can be disrupted in cases of impaired kidney function. This disruption may result in fluid overload due to reduced fluid filtration or dehydration caused by excessive fluid loss. Therefore, assessing hydration status is essential for all patients with acute kidney injury (AKI) or chronic kidney disease Hydration status can be evaluated clinically by examining mucous membranes, skin turgor, jugular venous pressure, chest auscultation, heart rate, blood pressure, edema, and symptoms such as thirst.

Sodium: The kidneys regulate sodium levels, and individuals with kidney disease are at risk of developing either hyponatremia or hypernatremia. Hyponatremia is the most common electrolyte imbalance in hospitalized patients, with a prevalence of 5–30%, whereas hypernatremia is less frequent, affecting 1–4%. Hyponatremia is categorized by severity: mild (serum sodium 130–134 mmol/L), moderate (125–129 mmol/L), and severe (less than 125 mmol/L). Acute severe hyponatremia may manifest as respiratory depression, confusion, and other symptoms.

Potassium: The kidneys are responsible for maintaining potassium homeostasis by excreting about 98% of daily potassium intake under normal conditions. In kidney disease, hyperkalemia may occur, though potassium levels typically remain stable in CKD until advanced stages. The normal potassium range is 3.5–5.0 mmol/L. AKI is frequently associated with hyperkalemia, and other causes include insulin deficiency, tissue breakdown, and medications such as angiotensin-converting enzyme (ACE) inhibitors.

Magnesium: Impaired renal function leads to reduced magnesium excretion, resulting in hypermagnesemia. A serum magnesium level above 2 mmol/L can cause symptoms like nausea and flushing, progressing to muscle weakness and hypotension. Levels exceeding 8 mmol/L may lead to respiratory muscle weakness, atrioventricular block, and cardiac arrest. Severe hypermagnesemia is rare in isolation and is often during treatment for hyperkalemia addressed.

Calcium and phosphate: calcium and phosphate homeostasis involves the kidneys, gut, bones, and parathyroid glands. Kidney impairment often causes hypocalcemia due to elevated phosphate levels, which accumulate as kidney function declines, binding calcium and reducing its levels. Additionally, decreased production of active vitamin D (calcitriol) reduces calcium absorption from the gut. These factors contribute to hypocalcemia in kidney disease.

Hydrogen and Bicarbonate: Acidosis is a common complication of kidney dysfunction, resulting from impaired hydrogen ion excretion, reduced bicarbonate production, and decreased bicarbonate reabsorption. Acidosis is more pronounced in conditions like renal tubular acidosis associated with AKI due to excessive renal bicarbonate loss. In CKD, oral bicarbonate supplementation is frequently used to manage this condition.

Objectives

1-To know the effect of CKD on myocardial function and electrolytes level.

2- what is the most common heart diseases among dialysis patients.

3- the changes of electrolytes level and which is the most common of the was effected by CKD in Ibn sina dialysis center .

Methodology

In this study we examined 100 patients in ibn sina dialysis center according to the

1-sociodemographic data involved (age , sex , year of dialysis and times of dialysis in aweek).

2- medical history of the patients (when diagnosed with HD, type of HD, electrolytes disturbance and if they had any heart attack or areest before .

3- Risk factors of heart disease among dialysis patients.

4- symptoms and complaint during dialysis session.

5- electrolytes disturbance and biochemical tests among dialysis patients .

Results

The study comprised of 100 patients With mean age 52.82±16.75 , age distribution shows the majority of participants were un the 50- 64 age group, accounting for 46% , This was followed by those with age 34-49 accounting 22 (22%), the least represented age group was > 79 , with only 4 (4%) . The sex distribution indicated a higher proportion of male patients , with 56 (56%) compared females 44(44%) . Regarding years of dialysis the majority was in the period < 1 year accounting 41 (41%) . This was closely followed by those with period of dialysis 1 -5 years accounting 37(37%) , and least was > 10 years with 5 (5%) patients . regarding the times of dialysis in week majority had 3 times in week accounting 89 (89%) compared with 2 times 11 (11%) as .presented in table 1

Table1 Sociodemographic data of the patients involved in the study (N= 100)			
		N	%
Age	< 34	11	11%
	34-49	22	22%
	50-64	46	46%
	65-79	17	17%
	>79	4	4%
Age (Mean ±SD = 52.82±16.75)			
Sex	Female	44	44%
	Male	56	56%
Years of dialysis	< 1 year	41	41%
	1 year – 5	37	37%
	5 years – 10	16	16%
	>10 Years	5	5%
Times of dialysis in a week	2 times	89	89%
	3 times	11	11%

In this study we examined the medical history of the dialysis patients , the results was that the most patients diagnosed with heart diseases after dialysis 63(63%) compared with 26(26%) diagnosed before dialysis , according to the types of HD the most common of dialysis patients 35(35%) had IHD followed by 28(28%) with HF and approximately same percentage 14(14%), 12(12%) had angina and cardiomegaly respectively , according to the Electrolytes disturbance the patients were mostly had disturbance in Ca 97(97%) followed by 37(37%) changes in K and 19(19%) disturbance in Cl and at the last was 11(11%) in Na . In last part in medical history we asked if they had any heart attack or heart arrest before and we found that 86(86%) were didn't have and 14 (14%) had as showed in the table 2 below .

Table 2 : medical history of the patients			
When diagnosed with heart disease	Before dialysis	26	26%
	After dialysis	63	63%
Type of heart disease	HF	28	28%
	Cardiomegaly	12	12%
	IHD	35	35%
	Angina	14	14%
Electrolytes disturbance	K	37	37%
	Ca	97	97%
	Na	11	11%
	Cl	19	19%
Had any heart attack or heart arrest	Yes	14	14%
	No	86	86%

In this study we examined the risk factors of heart diseases among dialysis patients , the prevalence of heart diseases categorized in to four types (heart failure, cardiomegaly, IHD ,angina) and these heart diseases were analyzed according to the risk factors (age, sex ,HT, DM ,smoking , duration of the dialysis) .

According to the age we found that the most proportion of heart failure 14(14%) and IHD 16(16%) was in age group 50_64 years , followed by same percentage of angina and cardiomegaly in the same age group with 4(4%) , overall there is no significant difference associated with age group (P value = 0.651)

Regarding to the sex we found that the most common male 19(19%) had IHD followed by 11(11%) , 10(10%) had HF and cardiomegaly respectively , the most common female 17(17%) had HF followed by 10(10%) had IHD , there is significant difference associated with sex (P value = 0.041)

According to the HT we found that the most common 31 (31%) of IHD patients had HT ,closely followed by 26(26%) of HF patients had HT and approximately 13(13%) , 12(12%) of cardiomegaly and angina patients respectively had HT , there is no significant difference associated with HT (P value = 0.690)

Regarding the DM we found that the most common 19(19%) of IHD patients had DM followed by approximately same percentage 9(9%), 7(7%), 6(6%) of HF , angina and cardiomegaly respectively , there is no significant difference associated with DM (P value = 0.051)

Regarding to the smoking the most common 8(8%) of heart disease was those with IHD were smoking and 1 (1%) of cardiomegaly patients were smoking , there is no significant difference associated with smoking (P value = 0.099)

And at the least of risk factors is the duration of dialysis , we found that the most common of the heart failure patients 14(14%) were in the duration of dialysis < 1 year followed by7 11 (11%(in the duration of dialysis 1_5 years , while those with cardiomegaly patients were most common in the duration 5-10 years followed closely 5(5%) in the duration 1-5 years , those with IHD most common 12 (12%) were in the duration 1-5 years followed closely 11(11%) ,1 year , at least the most common patients with angina 9(9%(in the duration < 1 year and only 1 (1%) in the durations (1-5 years , 5-10 years) , there is no significant difference associated duration of dialysis (P value =0,078) according to the table 3.

Table 3: risk factors of Heart diseases among dialysis patients										
		HF		Cardiomegaly		IHD		Angina		P value
Age	19_34	6	6%	2	2%	1	1%	0	0%	0.651
	35_49	5	5%	2	2%	5	5%	4	4%	
	50_64	14	14%	4	4%	16	16%	4	4%	
	65_79	5	5%	2	2%	5	5%	3	3%	
	>79	1	1%	0	0%	2	2%	1	1%	
sex	Male	11	11%	10	10%	19	19%	8	8%	0.041
	female	17	17%	2	2%	10	10%	4	4%	
HT	Yes	26	26%	13	13%	31	31%	12	12%	0.690
	No	2	2%	0	0%	0	0%	1	1%	
DM	Yes	9	9%	6	6%	19	19%	7	7%	0.051
	No	18	18%	7	7%	8	8%	5	5%	
Smoking	Yes	6	6%	1	1%	8	8%	2	2%	0.099
	No	2	2%	5	5%	3	3%	1	1%	
Duration of dialysis	<1 year	14	14%	3	3%	11	11%	9	9%	0.078
	1_5 years	11	11%	5	5%	12	12%	1	1%	
	5_10 years	4	4%	6	6%	3	3%	1	1%	
	>10 years	2	2%	0	0%	4	4%	2	2%	

Figure 1 : in this figure as show we found that the most common patients with heart diseases approximately 75(75%) had shortness of breath followed closely with 70(70%) percentage complained from palpitation with also closely 68(68%) had chest pain and at least 52 of patients had leg swelling.

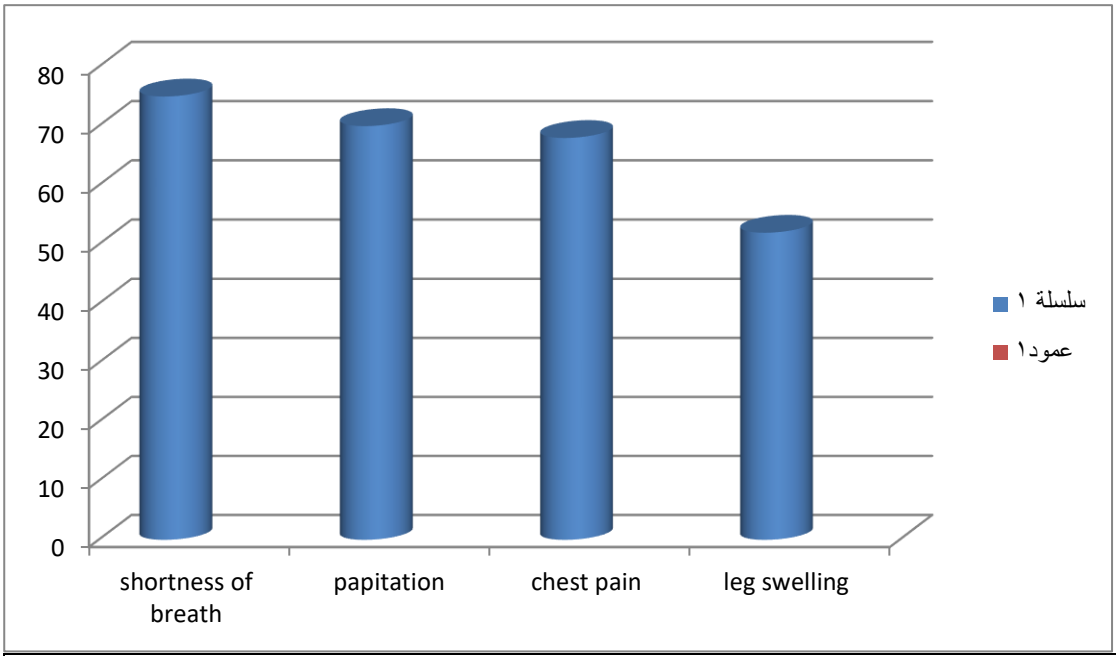


Figure 1 : Symptoms and complaint during dialysis session of the patients in this study

In this table we discussed the electrolytes disturbance and biochemical tests , according to electrolytes disturbance as showed in details in K the most patients were had hyperkalemia 34(34%) with only 2(2%) hypokalemia while regarding to Ca the condition is reversed the most common 76(76%) had hypocalcaemia and 21(21%) had hypercalcaemia at last the the most common patients with changes in Na level were hyponatraemia 8(8%) and 19(19%) of Cl changes were had hyperchloremia.

Regarding to the effect of the diet control on electrolytes disturbance 54(54%) were on diet compared 46(46%) weren't on diet , there is no (significant difference associated with diet control (P value =0.564

Regarding to the last time tested for electrolytes disturbance the most common were tested I month 54(54%) and the least were 9(9%) in duration 1-2week.

According to the drug adjustment regarding the last tests were 84(84%) didn't adjust it for them compared with 16(16%) were had adjustment , there is no significant difference associated with adjustment (P value =0.0909), the last part was if they had electrolytes disturbance before dialysis and 75(75%) of them weren't compared with 23(23%) were had as in table 4 below .

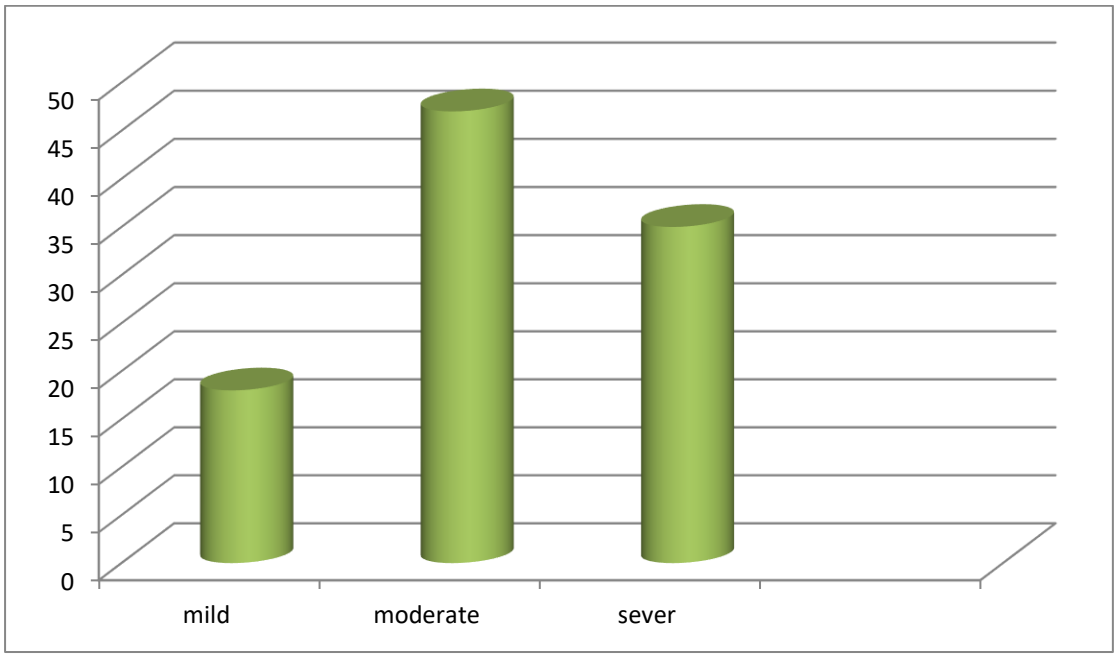
Table 4: electrolytes disturbance among dialysis patients and biochemical tests in this study					
Electrolytes disturbance		Hyper		Hypo	
	K	34	34%	2	2%
	Ca	21	21%	76	76%
	Na	3	3%	8	8%
	Cl	19	19%	7	7%
Have diet for control the electrolytes level	Yes	54	54%		p value = 0.564
	No	46	46%		
Last time tested for electrolytes	< 1 week		37		37%
	1_ 2 week		9		9%
	1 month		54		54%
Drug dose adjustment according to last tests	Yes	16	16%		P value = 0.909
	No	84	84%		
Had electrolytes disturbance before dialysis	Yes		23		23%
	No		75		75%

In this study we discussed the lifestyle and social , psychological condition of the patients , according to the drugs that they were taken in their life 97(97%) of them were take Ca ampule or tablets for hypocalcaemia followed closely by 67(67%) took antihypertensive drugs for control HT and heart diseases and the last was that 52 (52%) took insulin injections or tablets for DM control

While according to the level of stress that they had the most common of them 47(47%) described it as moderate stress and it was closely followed by 35(35%) with sever stress and 18(18%) of them were describe it as mild stress , and the last part was if the heart diseases or electrolytes disturbance effect on their daily life and 87(87%) of them had effect compared with 13(13%) were don't as in table 5.

Table 5 : lifestyle, drugs and social and psychological information of the patients in this study			
Drugs	Antihypertensive (capoten, aldomaite, carvidalol, amlodepin)	67	67%
	DM (insulin injections or tablets)	52	52%
	Ca ampule , tablets	79	79%
Level of stress	Mild	18	18%
	Moderate	47	47%
	Sever	35	35%
Dose HD or ED effect on your daily life	Yes	87	87%
	No	13	13%

Figure 2: when we asked the patients in dialysis session to describe the level of stress that they had in rang we categorized for them was 1-10 which the rang 1-3 (mild) ,4-6 moderate and 7-10 was (sever) the results was that the most of them 47(47%) ranged it as moderate(4-6) and it was followed by 35(35%) as sever and only 18(18%) describe it as mild stress .



The level of stress that the dialysis patients had during dialysis session .

Discussion

Globally , in patients that we examined in our study in Ibn sina dialysis center according to the myocardial function and electrolytes level in their dialysis duration that the most common of them which had heart diseases were have IHD followed by HF and 26% of were diagnosed before dialysis and is not little percentage makes us to focused on effect of heart diseases or the drugs that they were took before dialysis on kidney function not only the effect of CKD of myocardial function although was 63% diagnosed after dialysis.

while according to the electrolytes level one of the purposes of our study was to know what is the most common electrolyte effected and we found that the calcium was the most one effected(hypocalcaemia) 97% followed by k (hyperkalamia)37% when we compared it with another governments in Iraq found that in Babylon Governorate A study at Merjan Teaching Hospital in Babylon evaluated serum electrolyte changes in 40 chronic renal failure patients before and after hemodialysis. The findings indicated significant alterations in serum potassium levels(hyperkalemia) post-dialysis, highlighting the critical role of dialysis in managing electrolyte imbalances.

Najaf GovernorateA cross-sectional study conducted at Al-Sadar Teaching Hospital in Najaf assessed electrolyte disturbances among 200 patients admitted to intensive care units, including those undergoing dialysis. The study found that electrolyte abnormalities were prevalent, underscoring the need for vigilant monitoring in this patient population, Hyperkalemia (High Potassium Levels): Occurred in 14% of patients during their ICU stay ,Hypocalcemia (Low Calcium Levels): Identified in 26% of patients at the time (of admission

while regarding to the lifestyle of the patients the most common of them have no diet and we should focused in this point for educate the patients on the effect of not healthy feeding of their heart function and electrolyte level and when we talk about the level of stress that they had 35% of them described it as sever which most of them were alone when we met them and this highlights the importance of facilities and psychological support for the patients .

Conclusion

We concluded that among dialysis patients , the most of heart diseases among them was ischemic heart disease followed by heart failure and most of them diagnosed after dialysis and the calcium was the most electrolyte disturbance (hypocalcaemia) and according to the psychological mostly need social support and focused on their feeding.

References

1-Initiation of dialysis. Hakim RM, Lazarus JM.

2- A unified pathogenesis for kidney diseases, including genetic diseases and cancers, by the protein-homeostasis-system hypothesis. Lee KY. Kidney Res Clin Pract. 2017;36:132–144. doi: 10.23876/j.krcp.2017.36.2.132.

3- When to start dialysis: updated guidance following publication of the Initiating Dialysis Early and Late (IDEAL) study. Tattersall J, Dekker F, Heimburger O, et al. Nephrol Dial Transplant. 2011;26:2082–2086. doi: 10.1093/ndt/gfr168.

4- New clinical practice guidelines for chronic kidney disease: a framework for K/DOQI. Patel SS, Kimmel PL, Singh A. Semin Nephrol. 2002;22:449–458. doi: 10.1053/snep.2002.35973.

5- KDOQI US commentary on the 2012 KDIGO clinical practice guideline for the evaluation and management of CKD. Inker LA, Astor BC, Fox CH, et al. Am J Kidney Dis. 2014;63:713–735. doi: 10.1053/j.ajkd.2014.01.416.

6- Wright JT, Williamson JD, Whelton PK, Snyder JK, Sink KM, Rocco MV, Reboussin DM, Rahman M, Oparil S, Lewis CE, et al. A randomized trial of intensive versus standard blood-pressure control. N Engl J Med. 2015;373:2103–2116. doi: 10.1056/NEJMoa1511939.

7- Cheung AK, Rahman M, Reboussin DM, Craven TE, Greene T, Kimmel PL, Cushman WC, Hawfield AT, Johnson KC, Lewis CE, et al. Effects of intensive BP control in CKD. J Am Soc Nephrol. 2017;28:2812–2823. Doi: .

8- Matsushita K, Coresh J, Sang Y, Chalmers J, Fox C, Guallar E, Jafar T, Jassal SK, Landman GW, Muntner P, et al. Estimated glomerular filtration rate and albuminuria for prediction of cardiovascular outcomes: a collaborative meta-analysis of individual participant data. Lancet Diabetes Endocrinol. 2015;3:514–525. doi: 10.1016/s2213-8587(15)00040-6.

9- Fox CH, Kahn LS, Vassalotti J. A decade after the KDOQI CKD guidelines: impact on primary care. Am J Kidney Dis. 2012;60:707–709. doi: 10.1053/j.ajkd.2012.08.024.

10- Jankowski J, Floege J, Fliser D, Böhm M, Marx N. Cardiovascular disease in chronic kidney disease: pathophysiological insights and therapeutic options. Circulation. 2021;143:1157–1172. doi: 10.1161/circulationaha.120.050686.

11- P.A. McCullough, E.F. Philbin, J.A. Spertus, et al

Confirmation of a heart failure epidemic: findings from the Resource Utilization Among Congestive Heart Failure (REACH) study.

12- N.R. Hill, S.T. Fatoba, J.L. Oke, et al

Global prevalence of chronic kidney disease—a systematic review and meta-analysis.

13- P.A. McCullough, G.L. Bakris, W.F. Owen Jr., et al

Slowing the progression of diabetic nephropathy and its cardiovascular consequences.

14_ M. Haase, C. Muller, K. Damman, et al

Pathogenesis of cardiorenal syndrome type 1 in acute decompensated heart failure: workgroup statements from the eleventh consensus conference of the Acute Dialysis Quality Initiative (ADQI).

15- Sam, [16/01/2025 08:26

J.A. Tumlin, M.R. Costanzo, L.S. Chawla, et al

Cardiorenal syndrome type 4: insights on clinical presentation and pathophysiology from the eleventh consensus conference of the Acute Dialysis (Quality Initiative (ADQI

Sam, [16/01/2025 08:27]

16- R.L. Mehta, H. Rabb, A.D. Shaw, et al

Cardiorenal syndrome type 5: clinical presentation, pathophysiology and management strategies from the eleventh consensus conference of the Acute Dialysis Quality Initiative (ADQI).

17- Sam, [16/01/2025 08:37S.M. Butman et al

Bedside cardiovascular examination in patients with severe chronic heart failure: Importance of rest or inducible jugular venous distention

Sam, [16/01/2025 08:37.

18-A.G. Stack et al

Clinical correlates and mortality impact of left ventricular hypertrophy among new dialysis patients in the United States

Sam, [16/01/2025 08:37.

19-A. Levin et al

Left ventricular mass index increase in early renal disease: Impact of decline in hemoglobin

Sam, [16/01/2025 08:37.

20-C.T. Chan et al

Regression of left ventricular hypertrophy after conversion to nocturnal hemodialysis Sam, [16/01/2025 08:38

21- A.G. Stack

Impact of timing of nephrology referral and pre-ESRD care on mortality risk among new ESRD patients in the United State.

22- T. McGregor et al

Fluid and electrolyte problems in renal dysfunction

Sam, [16/01/2025 08:49

23- KDIGO 2012 clinical practice guideline for acute kidney injury

Kidney inter Suppl(2013)

Sam, [16/01/2025 08:50].

24- (https://docslib.org/doc/11180400/evaluating-of-serum-electrolyte-changes-in-chronic-renal-failure-pre-and-post-dialysis)

25- (https://medandlife.org/wp-content/uploads/13.-jml-2022-0039.pdf)