

Changes in value of some blood parameters before and after hemodialysis

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Abstract

A study was carried out on 50 patients with chronic renal failure in Kirkuk hospital. Blood samples were taken before and after haemodialysis to measure blood urea nitrogen and serum creatinine level and hemoglobin.

Objective of the study Determining the changes that occur before and after the dialysis process, which gives a better understanding of the number of times the kidney dialysis patients and the organization of a table suitable for the days of dialysis and give these indicators a deeper understanding of the body detoxification after the process of dialysis and also contribute to identify the appropriate food for them which ultimately benefit the patients Kidney failure.

Conclusion: The serum urea and serum creatinine And Hb are decrease after haemodialysis Because haemodialysis are as Worker to filtration in the patient with renal failure. The level of S. Urea & creatinine will low by instrument of haemodialysis to remove of residues of urea & creatinine that affected on patient as toxic substance.

Keywords: Hb: Hemoglobin, CKD: Chronic kidney disease, GFR: Glomerular Filtration Rate

I. INTRODUCTION

Dialysis: Is the process of removing excess water, solutes, and toxins from the blood in people whose kidneys can no longer perform these functions naturally This is referred to as renal replacement therapy.

Dialysis is used in patients with rapidly developing loss of kidney function, called acute kidney injury (previously called acute renal failure), or slowly worsening kidney function, called Stage 5 chronic kidney disease, (previously called chronic kidney failure and end-stage renal disease and end-stage kidney disease).

Dialysis is used as a temporary measure in either acute kidney injury or in those awaiting kidney transplant and as a permanent measure in those for whom a transplant is not indicated or not possible. .[1]

Hemodialysis: In hemodialysis, the patient's blood is pumped through the blood compartment of a dialyzer, exposing it to a partially permeable membrane. The dialyzer is composed of thousands of tiny hollow synthetic fibers. The fiber wall acts as the semipermeable membrane. Blood flows through the fibers, dialysis solution flows around the outside of the fibers, and water and wastes move between these two solutions.[2]

Patient: Fifty patient suffering from renal failure attended to the Kidney Dialysis Unit of Kirkuk hospital . were subjected to this study. Their ages ranged between 14-83 years with mean 44.8 ± 17.44 years

Sera collection : Five millimeter of blood were collected from antecubital vein can separated into test tube.

The first free container put 3 millimeter of blood for estimation

Of urea & creatinine to allowed for clotting followed centrifuge sera were separated.

The second tube put 2 millimeter of blood with anticoagulant to estimation Hb.

Material

1-Blood sample divided into two tubes

A-2 millimeter of blood in tube with anticoagulant.

B-3 millimeter of blood in tube without anticoagulant.

2-working reagent.

3- Instrument

A-spectrophotometer

B-hematology analyzer

C-centrifuge

D-micropipette.

Method:

Creatinine assay

Principle

Creatinine in alkaline solution react with picrate to form a coloured complex.

Sample collection and preparation

Serum or heparinized plasma diluted 1+49 with redistilled water.

Procedure

	Blank	Standard	Assay
Working reagent	1 ml	1 ml	1 ml
Demineralised	100 µ	----	----
Standard	----	100µ	----
Sample	----	----	100µ

Take the first reader after 30 second.

Take the second reader after 2 minute

Calculation

$$\frac{A_{\text{sample}}}{A_{\text{standard}}} \times 177 = \mu \text{ mol/l}$$

The wavelength spectrophotometer 520 nm

Urea assay

Principle

Enzymatic and colorimetric method based on the specific action of urease which hydrolyses urea in ammonium ions and carbon dioxide.

Ammonium ions then form with chloride and salicylate a blue-green complex. This coloration preparation to urea concentration in the specimen is measured at 600 nm.

Reagent preparation

Add contain of via R2(urease) into vial R1 (salicylate). Mix gently by inversion

Vial R3(base): dilute (1+3) with demineralised water when using automatic instrument, reagent R3 may be used undiluted.

Refer to instrument specific procedure.

Specimen collection and handling

Unhemolysed serum or heparinised plasma. Avoid fluoride or ammonium as anticoagulant which interfere with the assay.

Urea is stable in serum or plasma

- 24 hours at room termerture .

- several day at 2-8 °c.

- at least 2-3 months freezed.

Procedure

	Blank	Standard	Sample
Standard	-----	10μ	
Sample	-----	-----	10μ
Working solution	1 ml	1 ml	1 ml

Mix , incubate for 5 min at (20-25)c

Reagent 4	200μ	200μ	200μ
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Mix , incubate for 10 min at (20-25)c

Read at 580 nm

calculation

$$\text{sample collection} = \frac{A \text{ Sample}}{A \text{ Standard}} \times n$$

n=concentration of standard.

$$n=8.33 \text{ mmol/l}$$

$$\text{mmol/l} \times 6 \text{ mg/dl}$$

Hb estimation

By using (hematology analyzer 18 parameter)

Result:

In this study 50 patient suffering from renal failure .the age between (14-83) years with mean (44±17.44) years.

In the study of s.urea before dialysis the mean (20.05)mmo/l and SD

(11.70) and after dialysis the s.urea mean (17.5) mmol/land SD (8.53)

And study of s.creatinine before dialysis the mean (918.89)mmol/l and

SD(358.88) after dialysis the s.creatinine mean (504.36)mmol/land

SD(211.25) and study of Hb before dialysis mean (92.06) mmol/land SD

(17.70)g/l and after dialysis Hb the mean (91.32) g/lSD (18 .85) as show in Table (1-1).

Investigation			
	Blood urea mmol/l	Blood creat Mmol/l	Hb g/l
Before dialysis	mean	29.05	918.89
	SD	11.70	358.88
After dialysis	mean	17.5	504.36
	SD	8.35	211.25

Table (1-1)

{ investigation(mean &SD) of blood urea&creatinine &Hb before and after kidney dialysis }

S.urea:

Before dialysis the mean 28.7 and after dialysis 16.68.(as show in figure 1-2).

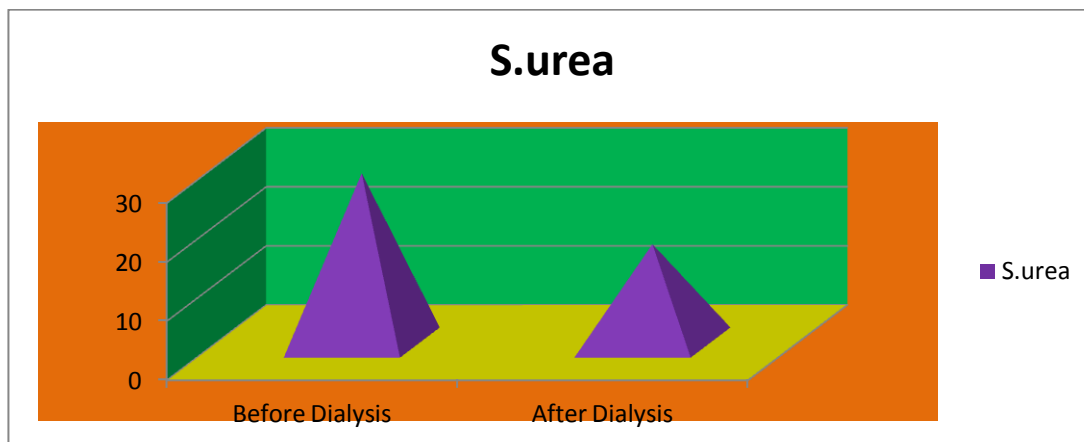


Figure (1-2) mean of s.urea before and after dialysis

s.creatinine:

before dialysis s.creatinine mean 198.89mmol/l and after dialysis 504.36mmol/l.as show in figure 1-3)

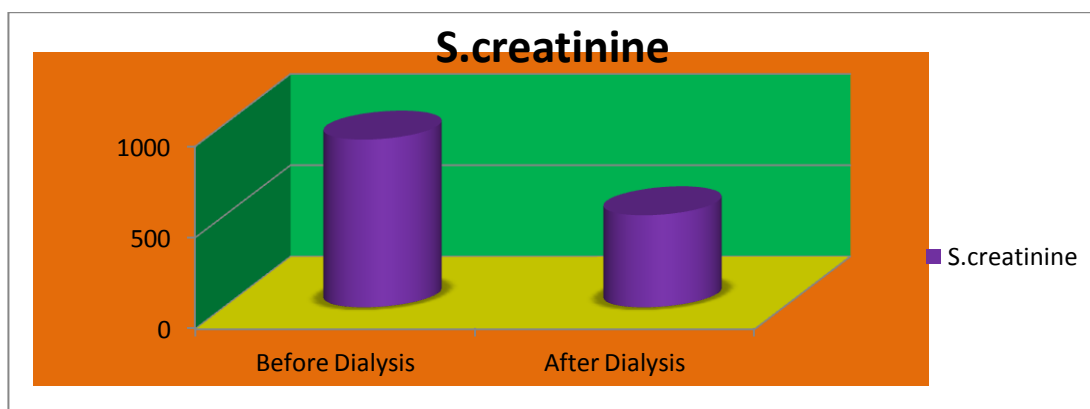


Figure (1-3)mean s.creatinine before and after dialysis.

Hb:

The mean of Hb before dialysis 92.06 g/l and after dialysis 91.32.g /l

Show in figure 1-4)

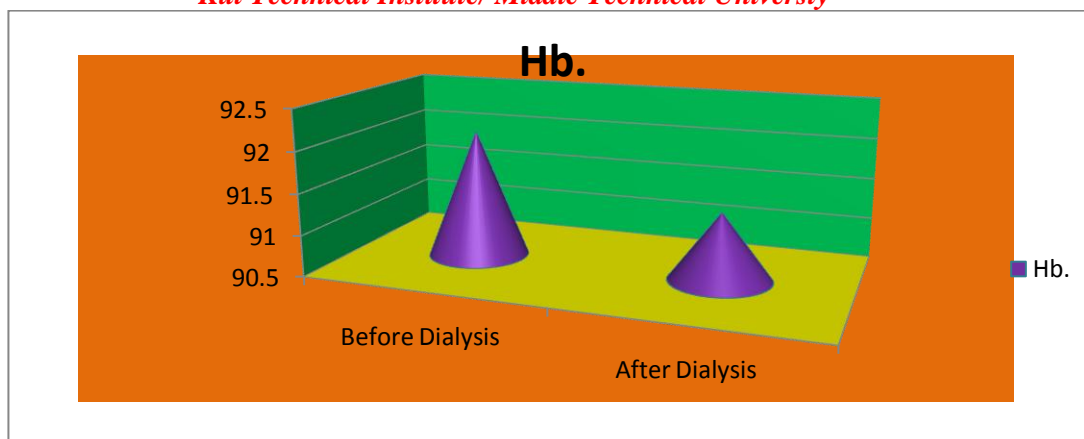


Figure (1-4) mean Hb before and after dialysis.

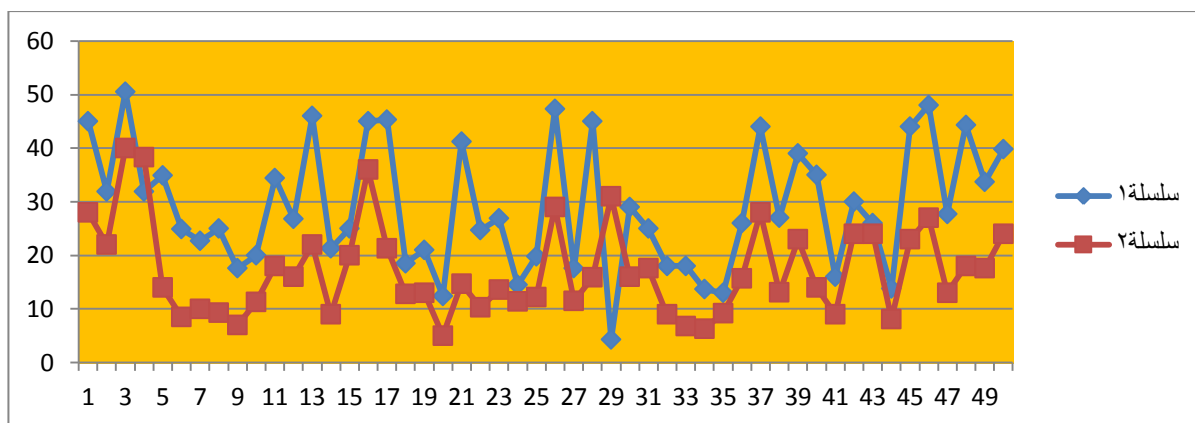
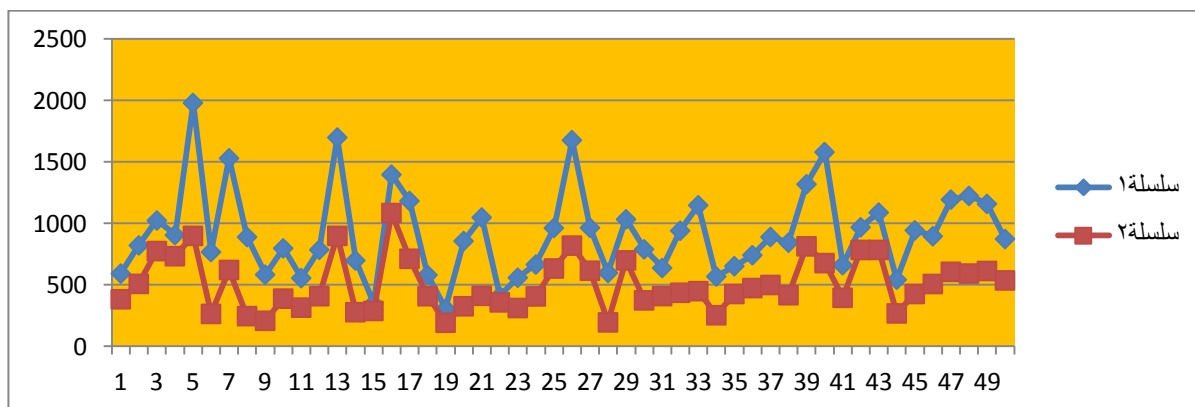


Figure (1-5) S .urea



Figure(1-6) s.creatinine

I. DISCUSSION

Anemia, mainly caused by a reduction in blood erythropoietin, concentration contributes to most of the disabling symptoms in patients on maintenance hemodialysis[3] However; there is no consensus on the target hemoglobin levels in hemodialysis patients. Although Hgb levels of 11 g/dL is generally considered as minimum target, there is evidence that hemoglobin target values should be individualized according to levels of kidney function, dialysis duration, and cardiovascular disease. In our study of 50 patient HD of Hb before dialysis mean 92.06 and after HD the mean of Hb is lower 91.32 after dialysis . in which female patients demonstrated a significantly lower

mean hemoglobin level compared to males, our study revealed that women and men. similar to reports from other parts of the world, women had a significantly higher prevalence of anemia than men.[4] [5]

Surrogates of nutrition such as the serum albumin and creatinine concentrations can predict of survival for HD patients. Moreover, half of the HD patients have some degree of malnutrition. [6][7][8]However, once adequate dialysis has been attained, patients usually regain a healthy appetite, and well-nourished patients are likely to have high predialysis concentrations of blood urea. And serum creatinine.the mean of serum urea.[9]

Before dialysis 29.05 and lower after dialysis the mean of serum urea17.5. Respectively. Some studies suggested that serum albumin and creatinine concentration are directly and inversely correlated with Hgb levels, respectively. [10] In our study, we found no correlation of hemoglobin with serum albumin and creatinine levels. Inadequate urea clearance by HD can result in malnutrition, anemia, and functional impairment with increased risk of hospitalizations, morbidity, and mortality. [11],[12]

II. RECOMMENDATION

- 1-must be make laboratory test before and after dialysis.
2. Take therapy of calcium –N- α .
3. Not eating food containing of high proteins.
4. Preservers of good nutritional system.
- 5 . Measurements of weight.
6. Take the injection does for patient and family of patient and stiffe of unit kidney dialysis.
- 7-Reduce the amount of fluid taked .
- 8-make kidney replacement faster to carry of age and cardiac disease
And diabetic.
- 9-perodic blood dialysis must be done for patient to avoid toxicity of urea.

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