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Evaluation of serum copper level pre and post hemodialysis in Sudanese patients with chronic kidney disease

ABDELRAZIG S. O.
Department of Chemical Pathology
Faculty of Medical Laboratory Sciences
The National Ribat University, Sudan
Dr. TARIG MOHAMED FADL-ELMULA
Department of Chemical Pathology
Faculty of Medical Laboratory Sciences
University of Khartoum -Sudan
LIZA HAMDI
Department of Chemical Pathology
Faculty of Medical Laboratory Sciences
University of Khartoum, Sudan

Abstract:

Background: *Cross section study include 40 patients with chronic kidney disease, samples were collected pre and post hemodialysis and assessed for serum copper level. The present study was aimed to investigate possible effect of hemodialysis to decrease copper concentration.*

Methodology: *Serum copper levels were analyzed by using atomic absorption spectrophotometer.*

Results: *Serum copper levels were decrease by (42%) post hemodialysis when compared to the prelevel .*

Conclusion*: Serum copper level were affected by hemodialysis.*

Key words: copper (cu), Hemodialysis (HD), End stage renal disease (ESRD),Chronic kidney disease (CKD).

INTRODUCTION

End-stage renal disease (ESRD) is final stage of CRF characterized by progressive, irreversible deterioration in renal function and body fails to maintain fluid, electrolyte balance and trace element. ESRD is characterized by decrease in glomerular filtration rate less than 10%[1]. Hemodialysis is essential kidney function, such as elimination of metabolic wastes, correction of electrolyte and acid base balance, are replaced by artificial purification system [2]. Trace element play important role in the structure of protein, enzyme and complex carbohydrate in participate in biochemical reaction[3]. Hemodialysis remove uremic toxins primarily by allowing equilibration of plasma and dialysate across a semipermeable membrane. Substance that have lower concentration in dialysate than in blood tend to be removed by dialysis. That may lead to depletion of biological essential substance. But may also substance found in dialysate but in blood will tend to accumulate in the patient, due to lack of renal clearance in hemodialysis patient may lead to toxicity form trace element taken by nutrition. Thus hemodialysis patient are at risk for deficiency and toxicity [4,5]. Major function of copper is component of enzyme involve redox reaction .Copper deficiency can causes amicrocytic, hypochromic anemia and also sever copper deficiency is associated with neurologic symptom ,decrease pigmentation and other condition [6] .Some study were done by Rajashri B. Bhogade, Adinath N. Suryakar, Nitin G. Joshi reported significant lower serum cu after hemodialysis p,<0.05 [7].

MATERIALS AND METHODS

Study design

Cross section study include of 40 patients with chronic kidney diseases admitted for hemodialysis. Among them 20 were female and 20 male, ages (14-77) years. All patients were

dialysis two times a week and each session was least four. They were dialyzed with bicarbonate membrane, the duration of dialysis (20-15) years.

Venous blood was collected pre and post hemodialysis immediately. Serum was separated and samples were diluted with deionized water and cu level was then measured with atomic absorption spectrophotometer. The concentration of cu in serum reported as mg/l after correction was mad, reference rang (0.7-1.4).

Study area

Patient admitted to Dr. Salma center university of Khartoum.

Study duration

March 2016 until May 2012.

Inclusion criteria

CKD patient undergo hemodialysis where selected. All patients had four hours dialysis session with bicarbonate dialysis membrane.

Exclusion criteria

Patients suffering from other disease, such as diabetes, inflammatory disease, alcoholic and respiratory were excluded. In addition to Patients how take copper supplement we are excluded.

Statistical analysis

All statistical analysis was carried out using (SPSS) software. Independent t-test.

RESULTS

In this study 40 for copper level pre and post hemodialysis.

Table 1 shows the mean of pre hemodialysis result (0.314±0.19), the mean of post hemodialysis result (0.183±0.16), the mean of age and the mean of duration.

Table 2 shows the correlation between the age and duration of serum copper level pre hemodialysis

Table 3 shows the correlation between the age and duration of serum copper level post hemodialysis

Table 4 shows the correlation between the copper level pre and post hemodialysis.

Table 1: shows t test

	Result mean
Pre	0.314± 0.19
Post	0.183±0.16
T calculated	4.354**
Age	45.45
Duration	7.71

** high significant at 0.01 level

Table 2

	pre	**P value**
duration	- 0.592**	0.000
post	-0.433**	0.005
age	-0.121 ns	0.457

Table 3

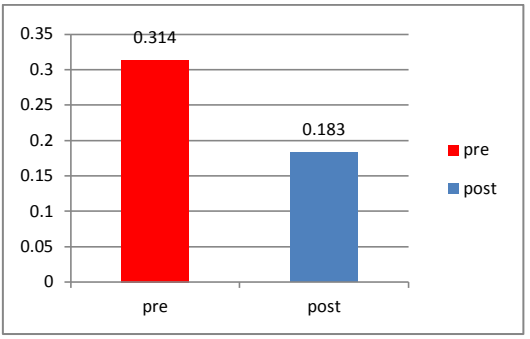
	Post	**P value**
duration	- 0.361*	0.002
age	-0.127 ns	0.433

Table 4

	post	**Pvalue**
pre	0.433**	0.005

** Correlation is significant at 0.01 level
*Correlation is significant at 0.05 level
ns correlation is not significant

Figure 1



The decrease rate = 42%

DISCUSSION

Trace element occur in very low concentrations in the body, their role in maintenance of important biological functions. I Agreement of study were done by Rajashri B. Bhogade, Adinath N. Suryakar, Nitin G. Joshi because my study was reported significantly lower serum copper level in CKD post hemodialysis compared with copper level pre hemodialysis $p<0.005$ and affect of duration in both pre $p<0.00$ and post level $p<0.002$. Their no significant with age in both $p<0.457$.

The CU concentration can be affected by multiple factor such as inadequate intake, malabosrption and time of sample collection. Samples were taken immediately after hemodialysis further studies are needed to evaluate serum copper level post hemodialsis at different time.

CONCLUSION

Serum copper level are directly affected by hemodialysis, duration and not affected by age.

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