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*Original Research Article*

# Assessment of Albumin, Protein and C - reactive protein in Regular Hemodialysis in Sudanese Children

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**Background:** Malnutrition and inflammation occur in maintaining hemodialysis patients and strong predictors of morbidity and mortality.

**Objective:** The aim of this study was to estimate the concentration of serum albumin, total proteins, C-reactive protein in regular hemodialysis children patients compared with children health as control subjects.

**Methodology:** This study was case control hospital based study carried out in Omdurman pediatric hospital during the period January – May 2015, blood sample were collected from 50 patients with ranged between ages 5-18 years. And 50 from normal child with match age of the patients as control subjects. Serum Albumins, protein, C-reactive protein were estimated using spectrophotometric methods.

**Result:** The (mean±SD) of Albumin, protein, C-reactive protein in patient respectively, were (3.49±1.18, 5.77±1.68, 23.5±29.4).

The (mean±SD) of Albumin, protein, C-reactive protein in the control study, respectively, were (4.55 ± 0.184, 7.2± 0.73, 6.88±1.11).The biochemical parameter protein was a significant decrease (p.value 0.00) C-reactive protein significantly in increase (p.value 0.00) and unchanged in Albumin.

**Conclusion:** This study was concluded that, increased in serum C-reactive protein and decrease in serum protein and no change in serum Albumin in Renal failure with compared to normally control.

**Key words:** Regular haemodialysis, serum C-reactive protein, protein, Albumin.

## INTRODUCTION

Maintenance haemodialysis (MHD) patients and they are strong predictors of morbidity and mortality in these patients <sup>(1)</sup>. The apparent causes of malnutrition are (anorexia; decrease indiatry intake, and chronic disease as (tuberculosis) <sup>(2)</sup>, indictor of malnutrition in MHD patients includes decrease dietary protein and energy intake <sup>(3)</sup>. Reduce serum albumin is a potent risk factor for mortality and morbidity in (MHD) patients and in other population <sup>(4)</sup> C-reactive protein (CRP) is secreted by the liver. Inflammation causes a rapid increase in its serum concentration, it plays a role in the host defense by interacting with the complement compared to measurements of other marker of inflammation and the acute phase reaction, serum CRP has several advantages. It is a simple, reliable and inexpensive test <sup>(5)</sup>. The common underlying mechanism can be an elevated level of inflammation markers (positive acute phase protein) that is associated with reduce renal function, oxidative stress, or other proinflammatory condition in dialysis patient, such as frequent contact with dialysis membranes, vascular accesses or dialysis fluid<sup>(6)</sup>. The objective of this study

was to estimate the concentration of serum albumin, total proteins, C-reactive protein in regular hemodialysis patients compared with children health as control subjects.

## Material and methods

### Study population

This is a case control hospital based study was conducted at the Omdurman pediatrics hospital. This study carried in Omdurman during the period of January –May 2015. 50 haemodialysis patients (30 males and 20 females) with age ranged between 5-18 years.

### Inclusion criteria

Children with regular hemodialysis in age range between 5-18 years in hospital during study period.

### Exclusion criteria

Patients suffer from inflammation, liver disease, bone disease and Malnutrition.

### Blood sample

About 50 samples will be collected from a child with dialysis and 50 from health control, Aseptically 5 ml of venous blood was collected from patients and control. As soon as the blood was collected from the patients, the blood was allowed to clot and serum was separated by centrifugation at 5000 RPM for minutes. It was used to estimate the main parameters. Serum Albumin, protein, C-reactive protein using Mindray for chemistry analyzer, after obtaining ethical clearance from an ethical review board and appropriate informed consent from the subjects as well as their parents.

### Statistical analysis

### Discussion

This prospective multicenter study on the impact of an HD Session on CRP level showed an increase in CRP level of the patients during a dialysis session. Moreover, independent of the predialysis CRP level, the change in CRP level During an HD session was associated with an increased mortality risk; an increase in CRP level was associated with a raised mortality risk. CRP is a marker of inflammation, which involves a number of complex processes that can be induced by any infection. As soon as the inflammatory stimulus has been eliminated,<sup>(7)</sup> the CRP level declines. The increase in CRP level observed in the present study could have been the result of such acute trauma or infection instead of a response to a dialysis<sup>(8)</sup>. Malnutrition and inflammation are associated with poorer clinical conditions and worse outcomes in the MHD patients, but nevertheless, there is no uniform method of assessing the nutritional and inflammatory status of dialysis patients<sup>(9, 10)</sup>. Results of the present study demonstrated that

SPSS for windows version -16 (2007) was employed for statistical analysis. The independent –samples, t-test procedure was used to compare the mean of the cases and controls. A result was presented as mean  $\pm$  SD.

### Result

There were 50 patients (female=20, male=30), 50 of which were investigated renal failure and 50 healthy as a control (female=23, male=27). The range of patients age (5-18) years, biochemical parameter protein was a significant decrease (p.value 0.00) C-reactive protein significant in increase (p.value 0.00) and unchanged in Albumin. The main common cause of renal failure which observed in this study as idiopathic 30%, urinary tract infection 22%, Nephritic 10%, Cystic 10%, stones 10%, error treatment 6%. Alpert syndrome 4%, Uretic problem urinary infection tract 22%.

CRP level itself and an increase in CRP level during a dialysis session are independently associated with an increased mortality risk. The higher the baseline CRP and the larger the increase in CRP

During a dialysis session, several mechanisms may be involved, Nutrition, inflammation, and oxidative stress<sup>(11, 12)</sup>. The greater range of CRP values may make it a more sensitive clinical indicator of morbidity than is albumin<sup>(13)</sup>. Kaysen G.A. et al (2003) showed an association between the CRP levels and reduced albumin levels in MHD patients in the HEMO study, multicentre randomized clinical trial<sup>(14)</sup>.

### Conclusion

Significant increase in serum C-reactive protein and significant decrease in serum protein and insignificant in serum Albumin sin Renal failure child patient, also, we have to measure the CRP value and protein regularly in all dialysis patients, because it is an indicator of inflammation and malnutrition, and to improve patient outcome patients.

**Table 1:** The demographic data causes of the renal failure

Causes	Frequencies
Idiopathic	30%
urinary tract infection	22%
Nephritic	10%.
Alpert syndrome	4%
uretic problem	22%
Cystic	10%
Stone	10%
Error treatment	6%.

Respectively which was no different between them insignificant of Albumin between patient and control which P-value = 0.463  
 The mean of Protein measured are (5.7 and 7.2) in patients and control, respectively, which was different between them. It's highly significant between patients and control P-value = 0.000.  
 The mean of CRP measured are (23.5 and 6.88) in patients and control, respectively, which was different between them. It's highly significant between patients and control P-value = 0.000

**Table 2:** (mean± SD) of serum biochemical parameter in study population

Parameter	Patients N=50	Control N=50	P-value
Albumin	3.49±1.18	4.55± 0.84	0.463
Protein	5.77±1.68	7.2±0.73	0.000
CRP	23.5±29.4	6.88±1.11	0.000

## References

- Koppel J. D. Path physiology of protein-energy wasting in chronic Renal failure.1999, J Nutr 129: S247–S251.
- Lowrie E. G. Acute phase inflammatory process contributes to malnutrition, anemia and possibly other abnormalities in dialysis patients.1988, Am J KidneyDis 32: S105–S112.
- Abdullah M. S, Wild G., Jacob V. et al. Cytokines and the malnutrition of chronic renal failure.1997, Miner Electrolyte Metab 23: 237–242.
- Don Br., Kaysen G. A. Assessment of inflammation and nutritionin patients with end stage renal disease patients.2000, JNephrol 13: S249–259.
- Kalantar-Zadeh K., Kopple J. D. Relative contributions of nutritionand inflammation to clinical outcome in dialysis patients.2001, Am J Kidney Dis 38 (6):
- Kaysen G. A., Chertow G. M., Adhikarla R., Young B., Ronco C., Levin N. W. Inflammation and dietary protein intake exert competing effects on serum albumin and creatinine in haemodialysis patients.2001, Kidney Int 60: 333–340
- Kaysen G. A., Greene T., Daugirdas J. T. et al. (2003): Longitudinal and Cross-sectional effects of C-reactive protein equilibrated normalized protein catabolicrate and serum bicarbonate on creatinin and albumin levels in dialysis patients. 2003, Am JKidney Dis 42 (6): 1200–1211.
- Pepys MB, Hirschfield GM: C-reactive protein: A critical update.2003,J Clin Invest 111: 1805–1812.
- Hatada T, Miki C: Nutritional status and postoperative cytokine response in colorectal cancer patients. , 2000,Cytokine12: 1331–1336.
- Stenvinkel P, Heimbürger O, Lindholm B, Kaysen GA, Bergstrom J: Are there two types of malnutrition in chronic renal failure? Evidence for relationships between malnutrition, inflammation and atherosclerosis (MIA syndrome). 2000, Nephrol Dial Transplant 15: 953–960.
- Stenvinkel P, Heimbürger O, Paultre F, Diczfalusy U, Wang T, Berglund L, Jogestrand T: Strong association between malnutrition, Inflammation, renal failure.1999,
- Levin NW: Inflammation and dietary protein intake exert competing effects on serum albumin and creatinine in hemodialysis patients. 2001, Kidney Int60: 333–340, 2001,Kidney Int55: 1899–1911, 1999
- Kaysen G. A., Chertow G. M., Adhikarla R., Young B., Ronco C., Levin N. W. Inflammation and dietary protein intake exert competing effects on serumalbumin and creatinine in haemodialysis patients,2001,Kidney Int60: 333–340, 2001 ,Kidney Int55: 1899–1911, 1999.
- Kidney Int 60: 333–340. 9. Kaysen G. A., Greene T., Daugirdas J. T(2003): Longitudinal andcross-sectional effects of C-reactive protein, equilibrated normalized protein catabolicrate and serum bicarbonate on creatinin and albumin levels in dialysis patients. 2003,Am J Kidney Dis 42 (6): 1200–1211.