

A STUDY ON BIOCHEMICAL PARAMETERS OF MALNUTRITION IN CHRONIC KIDNEY DISEASE PATIENTS UNDERGOING HEMODIALYSISBoppishetti Raja Adithya¹, S. Sangeeta², V. Sunanda³, S. Hari Priya⁴, G. Prakash⁵**HOW TO CITE THIS ARTICLE:**

Boppishetti Raja Adithya, S. Sangeeta, V. Sunanda, S. Hari Priya, G. Prakash. "A Study on Biochemical Parameters of Malnutrition in Chronic Kidney Disease Patients Undergoing Hemodialysis". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 84, October 19; Page: 14721-14725, DOI:10.14260/jemds/2015/2093

ABSTRACT: BACKGROUND: CKD is one of the leading cause morbidity and mortality worldwide. Incidence of chronic kidney disease is raising which is likely to pose major problems for both health care and the economy of future years in India. Dialysis is a form of renal replacement therapy for severe kidney failure. Malnutrition is one of the common complications in patients with end stage renal disease undergoing hemodialysis. **AIM:** The present study is aimed to evaluate role of albumin and other biochemical parameters predicting malnutrition in CKD patients undergoing hemodialysis. **MATERIAL AND METHODS:** A group of 15 normal healthy subjects (control group) and 30 CKD patients on hemodialysis (test group) were enrolled in this study. Albumin, urea, creatinine, total cholesterol and CRP were estimated in serum sample collected from normal and CKD-HD subjects. **RESULTS:** Results were expressed as mean \pm SD, student 't' test applied and 'p' value was calculated 'p' value <0.005 was considered as statistically significant. We found decreased levels of serum albumin ($p < 0.001$), increased levels of CRP ($p < 0.001$), increased levels of urea ($p < 0.001$), increased levels of creatinine was observed in CKD-HD patients compared to controls with the 'p' value <0.001. Total cholesterol was decreased in CKD-HD patients but not significant when compared to controls. **CONCLUSION:** our study found decreased serum albumin can be used as a indicator for malnutrition in CKD-HD patients on hemodialysis. CRP levels indicate a chronic inflammation in CKD patients on hemodialysis. **KEYWORDS:** CKD- Chronic kidney disease, ESRD- End stage renal disease, CRP- C Reactive Protein, Malnutrition.

INTRODUCTION: CKD is defined as pathological process with multiple etiologies resulting in decrease in nephron number and function leading to ESRD.⁽¹⁾ CKD is the one of the leading causes of morbidity and mortality worldwide. The incidence rate of 229 per million population is seen.⁽²⁾ Dialysis is a mode of renal replacement therapy in CKD and kidney transplantation increases the survival rate in those patients.^(3,4) Many complications are observed in hemodialysed patients during dialysis such as, hemorrhage, cardiac arrhythmia, air embolism, hypertension, malnutrition.⁽⁵⁾ Malnutrition is common phenomenon in maintenance dialysis patients and risk factor for poor quality of life and increased morbidity and mortality. Its reported prevalence varies between 18% and 75% in dialysis patients. The cause of malnutrition in dialysis patients is not very clear, but some probable causes are inadequate nutrient intake, anorexia, dietary restrictions, nutrient losses during dialysis, hypercatabolism caused by comorbid illness or associated with dialysis treatment, endocrine disorders of uremia etc.^[6] Serum albumin is commonly used as indicator of malnutrition in dialysis patients. An association of low albumin levels with increased mortality and morbidity in hemodialysis patients has been hypothesized.^(7,8) Some studies show dialysis is associated with chronic inflammation in the form of increase in CRP levels. This increase in CRP levels was shown to be associated with higher mortality

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risk in CKD-HD Patients.^(9,10) Our study is designed to evaluate the role of serum albumin as a marker of malnutrition in CKD patients on Hemodialysis and association of CRP levels with hemodialysis.

MATERIALS AND METHODS: A case control study was carried out in the Department of Biochemistry, Prathima institute of medical sciences, Nagunur, Karimnagar, Telangana, India. A total number of 45 subjects were included in this study and divided in to two groups. Group-I included 30 CKD-HD patients on hemodialysis twice weekly for more than one month, Group II includes 15 normal healthy subjects. Persons with impaired hepatic function, coronary heart disease, subjects on steroid therapy and immuno suppressant therapy were excluded from the study. Institutional Ethical clearance was obtained prior to the study. Informed consent was obtained from all the subjects. 5ml venous blood was collected in fasting state in plain tube and allowed to clot for 30 minutes and centrifuged at 3000 rpm for 10 minutes the obtained serum was analysed for Serum Albumin by Bromo cresol green method.^[11] Cholesterol by CHOD-PAP enzymatic photometric test.^[12] Urea by Berthelot method.^[13] Creatinine by modified Jaffe's test.^[14] The analysis of above parameters was done by using commercially available kits on XL-640 clinical chemistry automated analyzer. CRP was analyzed by semiquantitative slide method supplied by Tulip diagnostics ltd.^[15]

STATISTICAL ANALYSIS: Data was presented as mean \pm SD Student 't' test was applied between two groups and 'p' value is calculated. 'p' value <0.05 was considered as statistically significant.

RESULT: The present study was conducted in 45 subjects of which 30 CKD -HD subjects (Test group) and 15 normal healthy subjects (control group). The mean \pm SD of albumin in CKD-HD was 3.1 ± 0.33 and in control was 3.7 ± 0.28 . The albumin level was significantly decreased in CKD-HD when compared with controls with 'p' value <0.001 . The mean \pm SD of CRP in CKD-HD was 1.04 ± 0.80 and in controls was 0.47 ± 0.21 . There is significantly increased in CRP levels was observed in CKD-HD compared with controls with 'p' value <0.001 . The mean \pm SD of urea in CKD-HD was 134.06 ± 20.08 in CKD-HD and 27.40 ± 5.72 in controls. Significantly increased urea levels was observed in CKD-HD compare to controls with 'p' value <0.001 . The mean \pm SD of creatinine in CKD-HD was 11.32 ± 3.33 and in controls was 1.12 ± 0.26 . Creatinine level was significantly raised in CKD-HD with 'p' value of <0.001 in relation to that of controls. The mean \pm SD of cholesterol in CKD-HD was 155.83 ± 36.71 and in control was 177.33 ± 14.18 . Total cholesterol was decreased in CKD-HD, but not significant when compared to controls.

PARAMETERS	GROUP I (CKD-HD) N=30 MEAN \pm SD	GROUP II (CKD-HD) N=15 MEAN \pm SD	'P' VALUE
Age	38.11 \pm 11.6	38.62 \pm 11.07	0.82 (NS)
Albumin	3.1 \pm 0.33	3.7 \pm 0.28	<0.001 (S)
CRP	1.04 \pm 0.80	0.47 \pm 0.21	=0.001 (S)
Urea	134.06 \pm 20.08	27.40 \pm 5.27	<0.001 (S)
Creatinine	11.32 \pm 3.33	1.12 \pm 0.26	<0.001 (S)
Cholesterol	155.83 \pm 36.71	177.33 \pm 14.18	<0.035 (S)

Table I: Comparison of mean values and standard deviation between CKD-HD and controls

CKD-HD: chronic kidney disease patients on hemodialysis. CRP: C reactive protein. (Ns): not significant, (s): significant. Data expressed as mean \pm SD. ** indicates statistically significant 'p' value <0.05

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DISCUSSION: Malnutrition and wasting are commonly present in large proportion of patients with chronic renal failure on hemodialysis and they are unequivocally associated with mortality and morbidity. This can be due to inadequacy of dialysis, low dietary intake, inflammation or combination of these.^[16,17] CRP is produced by hepatocytes. It is a marker of inflammation which involves a number of complex processes that can be induced by any trauma or infection. In our study there is evidence of inflammation in CKD-HD with significant increase in CRP levels. Its levels decline once inflammatory stimulus is eliminated.^[18,19] Serum albumin is most frequently used to assess protein malnutrition as it reflects the visceral protein content. However, there are many factors which influence the synthesis distribution and degradation of albumin in the body. Still albumin levels will be considered as biomarker for assessment of malnutrition because of its larger half-life. But it cannot be used as sensitive indicator for nutritional therapy. Serum albumin also decreased with age in apparently healthy subjects.^[20] Our study showed decreased albumin levels in CKD-HD patients which was in parallel to Moncef et al.^[17] The earlier observation in CKD-HD patients demonstrated that albumin generation is reduced during acute phase response and also due to albumin leakage through dialysis membrane.^[21] There are evidences that systemic inflammatory response may be cause of protein catabolism and malnutrition in dialysis patients.^[22,23,24,&25] Inflammation in CKD-HD may be due to uremia perse, infections or incomplete clearance of cytokines etc. The inflammatory response in CKD-HD is an adaptative phenomenon to stress.

CONCLUSION: Our study showed elevated prevalence of malnutrition in HD subjects. Elevated CRP and serum albumin levels were common in malnutrition patients undergoing hemodialysis.

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