ORIGINAL ARTICLE

Effect of Dietary Counseling in Chronic Renal Failure Patients on Hemodialysis

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Abstract

Objective: The present study was conducted with the aim to assess and analyze the effect of dietary counseling the nutritional status of patients (>19 years) undergoing hemodialysis (HD) at least 3 months and in chronic kidney disease (CKD)-5 stage for the past 3 months. **Materials and Methods:** A total of 60 subjects were enrolled in the study (48 males and 12 females) in two groups; the first group taken proper medication and dialysis therapy and the second one additional diet counseling we suggested soy and paneer-like high biological protein. Different biochemical parameters such as blood urea, creatinine, and albumin along with the amount of calorie and protein intake were compared pre-nutritional counseling and post-nutritional counseling and protein dietary recommendation for 60 days during ongoing HD. **Results:** Short-term suggestion resulted in a significant statistically difference in the biochemical parameters. Proper dietary counseling along with high biological protein (1.2 gm/kg/ideal body weight) is given during HD superior the nutritional status of undernourished CKD patient. About proper diet counseling of the patients showed a positive response (<0.005) while the only medication and dialysis therapy showed an undergoing undernourished in their nutritional status. **Conclusion:** Patients undergoing HD frequently develop protein-energy malnutrition which is related to morbidity and mortality rate increases. Special nutritional care is required for the dialysis patient to improve the net protein anabolism.

Key words: Chronic kidney disease, hemodialysis, high biological protein, malnutrition, nutritional status

INTRODUCTION

Kidney is the vital human organ which is responsible for the filtration of nitrogenous and other metabolic waste products from the body through the urinary system and maintains the volume of biochemical, especially hemostatics fluid, electrolyte, and acid-base balance kidney also help to maintain blood pressure, activate Vitamin D, and produce erythropoietin in the human body.[1] The efficiency of kidney declined when its basic unit damaged by disease or factors, chronic renal failure (CRF) is the cause of uremia that is a drastically increased level of urea in blood serum in progressive and uncontrolled condition become is responsible for the development of acute glomerulonephritis and nephrotic syndrome.[2,3] CRF is a slowly progressive decline of renal function over a period of month or year consequential in unusually low glomerular filtration rate (GFR) which is frequently determined the indirectly increased level of creatinine in the blood serum.[4,5]

Patients who suffer from chronic kidney disease (CKD stage 4) have sophisticated kidney damage with a rigorous decline in the GFR to 15–30 ml/min.[6] Dialysis therapy (both peritoneal dialysis and hemodialysis [HD]) is not cures for end-stage renal disease (ESRD) but will help CKD patients feel improved and live longer. Dialysis is an artificial process by which nitrogenous waste products are isolated from the blood in the occurrence of kidney failure.[7,8] Adsorption is a specific characteristic that isolates nitrogenous waste in peritoneal and HD procedures [Table 1].[10,11]

It is found very commonly in a patient of CKD during the period when the GFR falls <10 ml/min; this clinical condition is called kidney renal failure (CRF). Dialysis patient needs a much privileged intake of high biological protein than the normal person. HD patients often suffering protein-energy malnutrition due to low intake of protein-energy malnutrition.[9,10]

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Table 1: Recommended dietary nutrient intake for hemodialysis patients (Alpers *et al*., 2008, Richards, 2011)

Nutrients	Recommended intake
DPI	1.2 g/kg/day for clinically stable patients (at least 50% should be of high biological value)
DEI	35 kcal/kg/day if<60 years 30–35 kcal/kg/day if 60 years or older
Total fat	25–35% of total energy intake
Saturated fat	<7% of total energy intake
Polyunsaturated fatty acids	Up to 10% of total calories
Carbohydrate	Rest of calories (complex carbohydrates preferred)
Total fiber	>20–25 g/day
Sodium	750–2000 mg/day
Potassium	2000–2750 mg/day
Phosphorus	800–1000 mg/day
Calcium	<1000 mg/day
Iron	10–18 mg/day
Water	Usually 750–1500 ml/day

DPI: Dietary protein intake, DEI: Daily energy intake, HD: Hemodialysis

MATERIALS AND METHODS

This study was conducted on 60 selected CKD patients of consecutive CKD stage-5 patients in MLB Medical College, Jhansi, India, from February 25, 2016, to March 30, 2017, aged between 19 and 65 years and undergone HD at least 3 months before. All the included patients have regular HD for minimum 2 times a week for CKD patients, who suffering 5 stage from the past 3 months.

The observational study was continued after approval from the Institutional Review Board (Human Ethics Committee), MLB Medical College, Jhansi. The Human Ethical Committee approval number is NO-838/SURGERY/15. Informed written consent was obtained from the patients before enrolment whose fulfilling the inclusion and exclusion criteria taken in this study. The patients were taken into two groups; both were suffering from CRF with the CKD-5 stage in the past 3 months. 30 patients were taken in each group. In this study, the 30 patients in the group first undergo with HD at regular compulsory 2 times interval in a week. In group second, all patients were having the same condition as like group first but additional counseling proper diet soy and cheese-like high biological protein (1.2 g/kg/ideal body weight).

The blood samples of patients (5 ml of intravenous) were collected in EDTA/without EDTA tubes after an overnight fast. After collection, the blood samples were allowed to clot for the ½ h following which the samples were centrifuged and serum was analyzed. Serum total cholesterol, high-density lipoprotein cholesterol (HDL-C), triglycerides (TGs), and low-density lipoprotein cholesterol (LDL-C) were measured calorimetrically using commercially available kits on fully autoanalyzer of Clinical Biochemistry Laboratory. Very LDL-C (VLDL-C) concentration was calculated using Friedewald's formula.[11,12] Nutritional assessment is done by 24 dietary recall methods.[13] All data collected 30-day interval 2 times in this study. Statistical data were recorded on Microsoft Excel program. The comparison between two groups was done by paired *t*-testin GraphPad Prism 7 software.[14,15]

RESULTS

A total of 60 patients were enrolled in this longitudinal study. Group 1 had 27 males and 3 females, whereas Group 2 had 25 males and 5 females that CKD patients undergone HD were taken dietary counseling. Table 1 is presented lipid profile, blood sugar, and urea.

In Group 1, mean baseline cholesterol was 173.37 ± 33.01 (mg/dl) and in Group 2 was 163.95 ± 29.35 (mg/dl). TGs, LDL-C, and VLD-C in Group 1 mean baseline was 157.22 ± 28.85, 97.5 ± 32.8, and 32.27 ± 7.25 (mg/dl) and in Group 2 was 137.9 ± 37.72, 99.71 ± 26.33, and 27.5 ± 6.79 (mg/dl). HDL-C mean baseline value in the group was 47.06 ± 06 (mg/dl) and in Group 2 was 50.7 ± 7.0 (mg/dl). Blood urea mean baseline in Group 1 was 146.42 ± 34.5 (mg/dl) and in Group 2 was 142.5 ± 36.16 (mg/dl). Random blood sugar mean baseline value was in Group 1, 110.86 ± 15.02 (mg/dl) and in Group 2 was 111.28 ± 12.02 (mg/dl). Hemoglobin baseline value in Group 1 was 7.68 ± 1.38 (mg/dl) and in Group 2 was 8.63 ± 1.4 (mg/dl) [Table 2].

Table 2 is presented anthropometrics measurements such as weights, body mass index (BMI), midupper arm circumference (MUAC), micronutrients (energy and protein), and serum albumin, weight mean baseline in Group 1 was 56.8 ± 6.7 and in Group 2 was 58.04 ± 6.11, BMI mean baseline in Group 1 was 21.41 ± 1.7 and in Group 2 was 21.95 ± 1.22. MUAC mean baseline in Group 1 was 22.18 ± 1.47 (cm) and in Group 2 was 24.1 ± 1.14 (cm), macronutrients energy

Table 2: Biochemical tests of lipid profiles, rbs, blood urea, and Hb, in CKD patients

Biochemical tests of CKD patients	Mean±SD of CKD patients undergone hemodialysis without dietary counseling	*P* value	Statistically significant (*P*<0.05)	Mean±SD of CKD patients undergone hemodialysis with dietary counseling	*P* value	Statistically significant (*P*<0.05)
Urea (mg/dl)	146.42±34.5	<0.346	No	142.5±36.16	<0.0001	Yes
RBS (mg/dl)	110.86±15.02	<0.553	No	111.28±12.02	<0.6484	No
Cholesterol (mg/dl)	173.37±33.01	<0.0003	Yes	163.95±29.35	<0.0145	Yes
HDL-C (mg/dl)	47.06±06	<0.2984	No	50.7±7.0	<0.0001	Yes
VLDL-C (mg/dl)	32.27±7.25	<0.0001	Yes	27.5±6.79	<0.1762	Yes
TGs (mg/dl)	157.22±28.85	<0.0001	Yes	137.9±37.72	<0.37	N0
LDL-C (mg/dl)	97.5±32.8	<0.0001	Yes	99.71±26.33	<0.0017	Yes
Serum creatine (mg/dl)	10.05±2.7	<0.57	No	12.81±3.55	<0.0001	Yes
Hb (mg/dl)	7.68±1.38	<0.015	Yes	8.63±1.4	<0.86	No

HDL: High-density lipoprotein, VLDL: Very low-density lipoprotein, LDL: Low-density lipoprotein, Hb: Hemoglobin, SD: Standard deviation, CKD: Chronic kidney disease, RBS: Random blood sugar

Table 3: Nutritional assessments of CKD patients on hemodialysis

Nutritional assessment tests of CKD patients	Mean±SD of CKD patients undergone hemodialysis without dietary counseling	*P* value	Statistically significant (*P*<0.05)	Mean±SD of CKD patients undergone hemodialysis with dietary counseling	*P* value	Statistically significant (*P*<0.05)
Weight (Kg)	56.8±6.7	<0.0001	Yes	58.04±6.11	<0.0001	Yes
BMI	21.41±1.7	<0.0145	Yes	21.95±1.22	<0.0001	Yes
MUAC (cm)	22.18±1.47	<0.0001	Yes	24.1±1.14	<0.0067	Yes
S. albumin (mg/dl)	3.49±0.4	<0.03	Yes	3.5±0.4	<0.187	No
Energy (Kcal)	1580.5±164	<0.0001	Yes	1644.0±96.93	<0.357	No
Protein (gm/day)	58.1±6.0	<0.0001	Yes	60.15±3.68	<0.0001	Yes

S. albumin: Serum albumin, MUAC: Midupper arm circumference, Kcal: Kilocalorie, SD: Standard deviation, CKD: Chronic kidney disease

(kcal) and protein mean baseline in Group 1 were 1580.5 ± 164 (kcal) and 58.1 ± 6.0 (g/day) and in Group 2 were 1644.0 ± 96.93 (kcal) and 60.15 ± 3.68 (g/day), and serum albumin mean baseline in Group 1 was 3.49 ± 0.4 (mg/dl) and in Group 2 was 3.5 ± 0.4 (mg/dl).

DISCUSSION

It is revealed from Tables 2 and 3 the foods intake was recorded at the past week of the month and after calculation to analyze the changes in the energy (calories) and protein intake. The CRF patients are at prone for cardiovascular disease (CVD), and they are more likely to die of CVD than to develop ESRD. The patients CRF is associated with premature atherosclerosis and an increased incidence of cardiovascular morbidity and mortality.[16] These several factors contribute to atherogenesis and CVD in patients with CRF, the notably among all is dyslipidemias.[17]

CRF primarily affects the metabolism of HDL and TG-rich lipoproteins.[10,18,19] The protein-energy is high prevalence (25–50%) among dialysis patients and is linked with increased morbidity and mortality. The prevalence of CKD has been increasing day by day and it is well known that patients are more likely to die than to progress to ESRD. The presence of multiple classical and novel risk factors influences this group of patients, and in fact, patient with premature cardiovascular mortality is due to ESRD.[20,21]

CONCLUSION

In this study, the result was concluded a high prevalence of malnutrition in HD subjects. The role of high biological protein source (soya and cheese nutritional value) in subjective patients on HD needs to be more attention in the management of CKD. The nutritional condition of CKD and ESRD patients remains a considerable cause for concern. Multimodal therapeutic strategies should be considered the better understanding of the pathophysiologic mechanisms of urea malnutrition and the improvements made in nutritional support. We hereby recommend that the assessment of nutritional status should be a part of routine evaluation of all CKD patients.

Recommendation

The conclusion of the present experimental study is the HD therapy that is very useful to counsel for other high-risk populations for operative intervention, dieticians should present a guide for instruct HD patients about individual nutritional needs. This guide should provide appropriate information about food nutrients sources, nutrients data and usage of exchange food, and avoidable foods.

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