

Nutrition Intervention of Patient with Chronic Kidney Disease (Stage 4) on Maintenance Hemodialysis

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Abstract

Chronic Kidney Disease is characterized by gradual and irreversible deterioration in the function of kidneys.

We report the case of 27 years old, female patient suffering from CKD (Stage 4) on Maintenance Hemodialysis. Dietary intervention was tailored for her using her past medical history and dietary intake. The dietary interventions were planned in 4 steps for 12 weeks that included nutritionally adequate food intake, Increase frequency of meals, modification & improvement in food preparation techniques, provision of educational material related to diet in dialysis. The patient lost 1 kg weight during the 3rd week of intervention followed by no further weight loss. Creatinine level improved from 4.7 mg/dL to 3.7 mg/dL indicating improvement in renal function.

Dietary assessment and modification should be an essential part of treatment in management of chronic kidney disease patients.

Keywords: Chronic Kidney Disease; Dietary Modification

Introduction

Chronic kidney disease (CKD) incorporates multiple disorders affects kidney and other associated organs of body [1]. Patients are typically diagnosed late in the course of illness, after over 75% of kidney function has been lost. It's a growing problem affecting with prevalence ranging from 8-16% worldwide, affecting largely poor pollution and features poor prognosis and high treatment cost [2].

CKD complications include risk of increased cardiovascular mortality, decreased bone health, acute renal failure, anemia kidney disease progression [3]. Diabetes mellitus is regarded major contributor of CKD across the globe. Since the incidence of diabetes is high in developing and under developed countries, concomitantly prevalence of CKD is also on the rise.

Nutritional management is cornerstone in management of CKD patients since malnutrition is very common in such patients which affects their quality of life and survival. here is increased risk of developing CKD in obese patients due to increased metabolic demands, intraglomerular pressure damaging the kidney. Obesity also becomes a great concern in patients undergoing dialysis and appropriate dietary management becomes essential to improve the kidney function and chances of survival. We reported a case of nutrition intervention of Patient with CKD (Stage 4) on Hemodialysis for decreasing and maintaining her weight in order to improve kidney function.

Presentation of Case

27 years old, female patient suffering from CKD (Stage 4) on Maintenance Hemodialysis with a history of osteodystrophy was presented to Shaikh Zayed Hospital (Kidney Outpatient Department) with poor dietary intake due to nutrition-related knowledge deficit with chief complain of 14 kg weight gain in 18 months. The patient had no information or awareness regarding diet in dialysis and was consuming calorie-restricted diet without any guidance from a health professional. The diet consumed was inadequate diet in terms of calories and nutrients. The anthropometric measurement included; height 165 cm; weight 82kg; BMI 30 kg/m² with 14 kg weight gain in eighteen months. Her Blood Urea Nitrogen (BUN) was 33.1 mg /dL which was elevated as per the references values. Her triglycerides and cholesterol were also elevated along with total proteins. Two years back, the patient took treatment for hair growth and legs pain, called Hijama (a cupping process in which blood is sucked out). Because of the treatment her hemoglobin levels dropped to 4g/dL, blood sugar level raised to 400mg/dL. Her usual dietary intake was two serving of cereals in breakfast, two servings of meat and cereal in dinner. Fluid intake was two cups per day with no lunch and snacks. Her food frequency revealed that there were decreased intake of vegetables and fruits and regular intake of rice and mutton.

The dietary interventions were planned in 4 steps for 12 weeks that included nutritionally adequate food intake, Increase frequency of meals, modification & improvement in food preparation techniques, provision of educational material related to diet in dialysis (Table 1 & Figure 1). The patient lost 1 kg weight during the 3rd week of intervention followed by no further weight loss.

	Weeks	Interventions	Description
STEP 1	1 - 2	Frequency of Meals	The patient started consuming 4-5 meals a day
STEP 2	3 - 6	Nutritionally adequate food intake	The introduction of food choices with improved macro and micro nutrients (Figure 1)
STEP 3	7 - 8	Modification & Improvement in food preparation techniques	Education about substitute cooking technique was given
STEP 4	9 - 10	Modified Recipes	Modified recipes for dialysis was provided
STEP 5	11 - 12	Provide educational material related to diet in dialysis	Educational material was provided related to diet in dialysis

Table 1: Nutrition Education Plan

Category	As Planned (Diet Plan)	Dietary Intake
Calories	1250kcal	1535 kcal
Protein (g)	48g	54g
Carbohydrates (g)	112g	175g
Fiber (g)	8g	11g
Total fat (g)	69g	84g
Saturated fat (g)	7g	14g
Monounsaturated fat (g)	38g	41g
Polyunsaturated fat (g)	18g	18g
Omega 3 (mg)	5mg	5mg
Cholesterol (mg)	264mg	295mg
Calcium (mg)	235mg	359mg
Potassium (mg)	1300mg	1397mg
Sodium (mg)	1501mg	2122mg
Copper (µg)	586 µg	805µg
Iron (mg)	7mg	10mg
Magnesium (mg)	111mg	130mg
Phosphorus (mg)	510 mg	593mg
Selenium (µg)	88 µg	100µg
Zinc (µg)	1mg	1mg
Vitamin A (RE)	645RE	743 RE
Vitamin B ₆ (mg)	1.2mg	1.2mg
Vitamin B ₁₂ (mg)	0.7mg	0.7mg
Vitamin C (mg)	34mg	36mg
Vitamin D(µg)	1 µg	1 µg
Vitamin E (mg)	12mg	12mg
Vitamin K (µg)	59 µg	63 µg
Folate (µg)	276 µg	409 µg
Thiamine (mg)	1.0mg	1.3mg
Riboflavin (mg)	1.0mg	1.3mg
Niacin (mg)	19mg	22mg
Choline (mg)	204mg	220mg

Figure 1: Nutrition Education Plan

Discussion

Loss of lean body mass that is attributed to increased protein metabolism is evident in most of the patients undergoing dialysis in CKD [4]. Another aspect that develops in such patients is malnutrition–inflammation complex syndrome, with the account of malnutrition and the chronic inflammation [5,6]. The main aim to provide nutritional interventions to such patients is to control the accumulation of specific mineral such as potassium and phosphorous and to prevent the assimilation of metabolic waste products. Though dialysis is the main stay of treatment in CKD grade IV patients, but it also adversely affects the energy needs of the patients. Glucose is removed from the dialysate resulting in decreased energy intake with loss of protein from the peritoneal membrane. The dialysis modality affects the nutritional needs of CKD patients. For instance, PD patients have to decrease their energy intake because of the absorption of glucose from the dialysate. On the other hand, their protein requirements may be higher because of protein losses through the peritoneal membrane. Malnutrition may manifest as under or over nutrition in such patients. Under nutrition may also be manifested due to strict dietary restriction imposed on such patients due to which their condition further worsens [7]. Dietary prescription tailored as per need of the patients by clinical dietitian should always be preferred for CKD patients [8].

Conclusion

Dietary assessment and modification should be an essential part of treatment in management of chronic kidney disease patients.

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