**Clinical Outpatient Case Study**

**Chronic Kidney Disease Stage 4**

**Case Description and Background**

Chronic kidney disease (CKD) is a gradual decline in kidney function over the time period of three or more months and is measured by the glomerular filtration rate (GFR).1 Included among the functions of normal kidneys are fluid and electrolyte regulation and the filtration of metabolic waste products.The kidneys are also responsible for the endocrine functions of renin production, calcitriol (hormonally active form of vitamin D) production and erythropoietin production. The GFR is used to differentiate the five different stages of CDK. The GFR is calculated based upon several factors, including gender, age, race and serum creatinine levels.1

The five stages of kidney disease are defined as follows: Stage 1 is defined as damage to the kidneys with normal or slightly increased GFR of >90. In stages 2, 3 and 4 there is a gradual decline in kidney function measured by the GFR. Stage 2 CKD is characterized by kidney damage with a mild decrease in GFR of 60-89, stage 3 has a moderate decrease in GFR of 30-59, stage 4 is marked by a severe decrease in GFR of 15-29 and finally, stage 5 is kidney failure with a GFR of <15 or on dialysis. At stage 5 the options for renal replacement therapy (RRT) include kidney transplant, peritoneal dialysis and hemodialysis.1,2

 The nutrients that are affected and those that should be carefully monitored in kidney disease include, energy, sodium, protein, potassium, phosphorus, calcium, iron and vitamin D. The absorption, excretion and metabolism of these nutrients is altered in CKD.2,4 A common complication of kidney disease is the development of protein energy malnutrition (PEM). When PEM is present it is often correlated with a less than favorable patient outcome. This fact underscores the need for patients with CKD to receive nutrition counseling and follow up with an RD in order to benefit the patient and ensure a more positive outcome. The RD will perform nutrition assessment, counseling and subsequent dietary modification based upon the patient’s individual needs and circumstances.2-4

 Protein recommendations for adults with CKD, not currently on dialysis, without the complication of diabetes are 0.6 g protein/kg of body weight to 0.8 g protein/kg body weight per day. Evidence suggests that a lower protein intake of 0.7 g protein/kg per day will delay the decline of glomerular filtration rate.5

 The patient (SR) is a 68 year old Caucasian woman with a history of Chronic Kidney Disease, stage 4. (The GFR of this patient indicates stage 4 CKD. However, the actual prescription form the physician reads: stage 3 CKD). She has a diagnosis of polycystic kidney disease. Based upon the current GFR of 21 mL/min/1.73 and the presence of severe proteinuria, the client is at very high risk for CKD progression and cardiovascular disease. During her nutrition counseling session, a therapeutic diet to meet her kcal and protein needs without exceeding the limits for sodium, phosphorus or fluid was discussed.

**Nutrition Assessment Data**

Height: 4’11”

Weight: 131 lbs.

Usual weight: 135

BMI: 26.5

Weight change: Lost 4 pounds in past month

**Biochemical Data**

|  |  |  |
| --- | --- | --- |
| Parameters | Value | Normal Range |
| Glucose, serum | 113 mg/dL H | 65-99 mg/dL |
| BUN | 39 mg/dL H | 8-27 mg/dL |
| Creatinine, Serum | 2.35 mg/dL H | 0.57-1.00 mg/dL |
| eGFR | 21 mL/min/1.73 L  | >59 mL/min/1.73 |
| BUN/Creatinine Ratio | 17 | 11-26 |
| Sodium, Serum | 136 mmol/L | 134-144 mmol/L |
| Potassium, Serum | 4.8 mmol/L | 3.5-5.2 mmol/L |

 Chloride, Serum 96 mmol/L L 97-108 mmol/L

|  |  |  |
| --- | --- | --- |
| Carbon Dioxide, Total | 27 mmol/L | 19-28 mmol/L |
| Calcium, Serum  | 9.9 mg/dL | 8.6-10.2 mg/dL |

Additional labs that would have been helpful, but were not available are: albumin, Alk/phos, PTH, Hematocrit and Hemoglobin and erythropoietin.

**Nutrition Focused Physical Findings**

The Client appears oriented and mentally alert. There is no unintentional weight loss, muscle tone appears to be good. Her oral health is good, she has her own teeth.

**Client History**

No history of smoking. History of social dinking, none presently. She shows interest in learning about the care of her condition and is receptive to dietary counseling. She is responsible for food shopping and meal preparation within her household.

**Food and Nutrition Related History**

**Breakfast**

Cranberry juice

1 egg

2 slices Ezekiel Bread

Decaf Coffee

**Lunch**

Cereal with cinnamon

**Dinner**

Hamburger on Ezekiel Bread

Salad with radishes

**Snack**

Activia Yogurt

**Medications**

Alvesco 160 mg 2 puff BID

Xopenex HFA

Aromacin 25 mg

Singular

Livaolo

Prevacid

Clarinex

Synthroid

**Supplements**

Ultra Omega 3 100mg/d

CoQ10 200mg/d

B12 1000mg/d

Ester C 500mg/d

Multivites gummy 1/d

D3 100 IU/d

Accuflora probiotic

Renal vitamin

SR’s BMI is 26.5. She is currently at 98% of her usual weight. According to KDOQI guidelines her BMI should be kept in the upper 50th percentile, between 23.6 and 24.1 A 4 pound intentional weight loss has occurred over the previous month. The goal is to keep weight trending toward recommended BMI level of 23.6-24.0, while maintaining a healthy nutritious diet.

Sodium, potassium and phosphorus are nutrients excreted by the kidney, they must be limited within the diet of a patient with stage 4 CKD. Client should restrict phosphorus to (800 to 1000 mg/d) and potassium to (2000 to 4000 mg/d). Dietary sodium reduction to 2300 mg/d is recommended based on the DASH and DASH-Sodium diets.1 An excess of sodium in the diet can lead to peripheral and pulmonary edema, hypertension and cardiac hypertrophy.2,5 Life threatening cardiac arrhythmias can result from hyperkalemia.2,5 It is best to control posphorous levels through a combination of phosphate binders and diet. Secondary hyperparathyroidism and metastatic calcification can result from high serum concentrations of phosphorus.4-5

 Based upon client’s weight 131 pounds or 59.5 kg and 20-25 kcals/kg1, she should be consuming at least 1190-1487 kcals per day. She should consume 0.8 g protein/kg, with at least 50% coming from high biologic value protein.1,2 This translates into 47.6 g protein/d.

**Nutrition Diagnosis**

Food and nutrition related knowledge deficit (NB-1.1) related to consumption of foods inconsistent with dietary specifics for stage 4 CKD as evidenced by questions asked and dietary recall.

**Goals for Nutrition Therapy**

Keep weight within recommended BMI level of 23.6-24, while maintaining a healthy nutritious diet.

Maintain serum calcium 8.4-10.5 mg/dL

Maintain serum phosphorous 3.5-5.5 mg/dL

Achieve and maintain a serum albumin of > 4.0 g/dL.

Goals will be monitored by assessment of weight, dietary intake recalls and serum levels of calcium, albumin and phosphorous. On follow up, labs will be reassessed and diet recall reassessed. Labs will also be reviewed to see if the plan is on target and how the patient has progressed.

**References**

1. National Kidney Foundation. K/DOQI practice guidelines for chronic kidney disease: evaluation, classification, and stratification. *Ann Intern Med.* 2003;139 (2):137-147.
2. National Kidney Foundation (NKF). K/DOQI nutrition in chronic renal failure. *Am J Kidney Dis*. 2000; 35: (Suppl 2): S1-S139.
3. Beto JA, Bansal VK. Medical nutrition therapy in chronic kidney failure: integrating clinical practice guidelines. *J American Diet Assoc* 2004; 104:404-409.
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5. Nutrition and Dietetics Chronic Kidney Disease (CKD) Evidenced-Based Nutrition Practice Guideline. Chicago, IL: Academy of Nutrition and Dietetics; 2010. Related link: [Website](http://www.adaevidencelibrary.com/topic.cfm?cat=3927). Accessed April 25, 2014