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Renal Diet

Renal diets should be used for individuals with various degrees of renal failure and undergoing a choice of treatments. The objectives are to provide optimal nutrition and to minimize symptoms of uremia, fluid imbalance and metabolic disorders in renal disease. Nutritional management of the renal patient is dependent on the cause of the renal disease, residual kidney function and current treatment option. It can be a complex combination of any one or more modifications: protein, potassium, phosphorus, sodium, fluid and calories or carbohydrates. Nutritional management of a renal patient depends on the current type of treatment, the amount of remaining renal function and the patient's nutritional status.

Predialysis Conservative Management

- **Protein-** Protein restriction may slow down the progression of renal failure. Dietary protein restriction usually begins early on in renal failure. Protein may be restricted to 0.6-0.8 gm/kg body weight. Patients with proteinuria are restricted to 0.8 gm/kg day. Approximately 60% of the protein should be of high biological value (HBV).
- **Sodium-** Sodium restriction may range from 1 to 4 gm/day depending on the patient's blood pressure control and the amount of edema. Severe sodium restriction of less than 2 gm/day is rarely indicated except for patients with anasarca and/or in combination with chronic heart failure. Sodium restriction is usually between 2-4 gm/day. Sodium intake is liberalized in patients with sodium wasting nephropathy and when patients experience increased sodium loss and dehydration through vomiting, diarrhea and anorexia.
- **Potassium-** Most patients do not require dietary potassium restriction unless urine output is greatly diminished to less than 1000 mL/day. Patients who are on specific diuretics may need liberal potassium intake or a potassium supplement. If hyperkalemia occurs, potassium may be restricted to 2 to 3 gm/day as indicated.
- **Fluids-** Fluid restriction is usually not indicated unless the patient has increased edema and decreased urine output. Fluid restriction, if indicated, is usually temporary. The patient's volume status is normally controlled with diuretics and sodium restriction.
- **Energy-** It is difficult to reach the recommended 35 kcal/kg. Simple carbohydrates (sugars) are abundantly used in individuals without diabetes for calories. The percentage of calories from fats, preferably from monounsaturated and polyunsaturated fats is usually increased to provide adequate calories.

Hemodialysis and Peritoneal Dialysis

- **Protein-** Protein intake is controlled in dialysis patients to reduce blood urea nitrogen (BUN) while providing adequate calories. The recommended protein intake for Hemodialysis patients is 1.2 gm/kg. For peritoneal dialysis patients, the levels are increased to 1.2 to 1.3 gm/kg due to increased protein losses in the dialysis fluids.
- **Sodium-** Sodium restriction in dialysis patients is often necessary to control thirst and avoid excessive fluid intake which often causes shortness of breath, hypertension, cardiomegaly and chronic heart failure. Sodium is restricted to 2 to 4 gm/day as needed.
- **Potassium-** Potassium is controlled in renal diets to avoid hyperkalemia which may lead to irregular heartbeats. Hemodialysis patients usually require potassium restriction of 2 to 3 gm/day. It is calculated by using 1mEq of K per kg body weight. However, peritoneal dialysis patients usually do not require potassium restriction due to loss in the dialysis fluids and the continuous nature of peritoneal dialysis. When potassium restriction is indicated, limit fruit and vegetable choices and other high potassium foods. Since potassium is water soluble, the potassium content of food can be reduced by peeling, cutting into small pieces, soaking in large amounts of water overnight, and boiling the food. As a result of water treatment, canned fruits and vegetables are generally lower in potassium

than fresh or frozen. Salt substitutes usually contain KCL and should be restricted unless supplementation is needed.

- **Phosphorus-** The purpose of phosphorus restriction in dialysis patients is to control secondary hyperparathyroidism which causes bone diseases. Phosphorus is restricted to 800 to 1200 mg/day. Dairy products, legumes and other high phosphorus foods are usually limited. Phosphate binding medications are often prescribed to reduce phosphorus absorption from the gastrointestinal tract. These medications should be taken with meals and snacks. The amounts of phosphate binders should be adjusted according to the phosphorous intake and the serum phosphorus levels.
- **Fluids-** Fluid restriction is essential in dialysis patients when there is little or no urine output. This prevents excessive fluid accumulation which often leads to shortness of breath, hypertension and congestive heart failure. The amount of fluid allowed should take into consideration the amount of urine output. Fluid is usually restricted to 1000 mL/day plus the amount of urine output. All the foods and beverages that are liquid at room temperature should be considered fluids. Examples include:
 - water -coffee -tea -ice -frozen juice bars
 - gelatin -fruit juices -vegetable juices -liquid from canned fruits and vegetables
 - alcoholic beverages -milk -cream -sherbet
 - ice milk -carbonated beverages
- **Energy-** The recommended caloric intake for Hemodialysis and peritoneal dialysis patients is 35 kcal/kg body weight if less than 60 years of age and 30 kcal/kg body weight for patients who are over 60 years old. Peritoneal dialysis patients may need to reduce caloric intake to prevent unwanted weight gain due to glucose absorption from dialysis fluids. The amount of calories absorbed per day depends on the amount and the dextrose concentration of the dialysis fluids. It is estimated that 50% - 80% of the dextrose is absorbed. The amount of calories absorbed can range from 300 to 900 kcal/kg. If the patient is gaining weight, and then 20 to 25 kcal/kg is recommended.

The loss of appetite due to uremia and dialysis clearance of water-soluble vitamins may cause vitamin deficiency. Fat soluble vitamin supplementation is not indicated in renal patients as levels of Vitamins A, E and K are usually normal or above normal. Vitamin D supplementation should be individualized and closely monitored to avoid hypercalcemia. It is recommended that B complex vitamins be supplemented at the DRI level, with the exception of folate (800-1000 mcg) and pyridoxine (10mg). Excessive Vitamin C is contraindicated due to the possibility of asymptomatic oxalises, which is the disposition of calcium oxalate in renal and extrarenal tissue.

Vitamins and Minerals Recommended

Ascorbate (Vitamin C)	60-100 mg
Thiamin (Vitamin B1)	1.5-2.5 mg
Riboflavin	1.8-2.0 mg
Pyridoxine	1.0 mg
Cobalamin (Vitamin B12)	3 mg
Pantothenic Acid	5-10 mg
Niacin (Vitamin B2)	20 mg
Folate	0.8-1mg
Calcium	1400-1600 mg
Iron	Approximately 100 mg
Zinc	15 mg