

RENAL

NUTRITION FORUM

A Publication of the Renal Dietitians Dietetic Practice Group

■ VOLUME 25 NUMBER 3 ■ SUMMER 2006

Renal
Dietitians

A Dietetic Practice Group of
American Dietetic Association

In This Issue:

Potassium Management in Peritoneal Dialysis	1
From the Editor's Desk	2
Maximizing Your High Biological Value	6
Renal Dietitians Chair Message	12
CRN Chairperson Message	14
RPG Member Advantages	16
2005-2006 RPG Membership Survey Results	17

Potassium Management in Peritoneal Dialysis Patients: Can an Increased Potassium Diet Maintain a Normal Serum Potassium without a Potassium Supplement?

By Karen F. Factor, MBA, RD, LDN. Karen is a renal dietitian in Carrboro, North Carolina specializing in Peritoneal Dialysis. She can be contacted at Karenfactor@nc.rr.com

Introduction

Potassium management of hemodialysis (HD) and peritoneal dialysis (PD) varies greatly. Because of the continuous nature of PD versus the intermittent schedule of HD, patients on PD tend to run normal to low serum potassium concentrations. Hyperkalemia rarely occurs in patients receiving PD, and it may indicate inadequate dialysis. Peritoneal dialysis removes more potassium (K⁺) than HD because of the increased time that patients undergo PD. Patients transitioning from HD to PD are at risk of hypokalemia because many patients were restricting dietary K⁺ prior to dialysis initiation or while receiving HD. The ranges for serum K⁺ levels can be found in Table 1 (1).

Table 1: Ranges of Serum Potassium Levels

3.5 – 5.5 mEq/L	(Normal range)
<3.5 mEq/L	(Hypokalemia)
>5.5 mEq/L	(Hyperkalemia)

Hypokalemia can be triggered by a variety of circumstances including: 1) inadequate dietary K⁺ intake, 2) malnutrition, 3) prolonged gastrointestinal losses such as diarrhea, vomiting, or gastric suction, 4) diuretic therapy, 5) diabetic acidosis, and 6) magnesium deficiency.

Patients with hypokalemia can have muscle weakness, abdominal distention, and irregular heart contractions. Hypokalemia can lead to central nervous system changes with confusion and affective disorders. When vomiting occurs without appropriate fluid replacement, a great loss of acid may result in metabolic alkalosis. Symptoms of metabolic alkalosis include labored breathing, headaches, drowsiness, irritability, nausea, and rapid heart rate (1).

Methods

Five patients, ages 18 – 60 years, with a history of hypokalemia were included in the study population. All patients were receiving continuous cyclical peritoneal dialysis (CCPD). No patient had a history of diarrhea or GI losses, and all patients reported normal appetites. The dialysate utilized by these patients contained no K⁺ and the electrolyte content remained constant throughout the study. None of the patients were taking a K⁺ supplement. Prior to the initiation of the study, these patients did not consume a significant amount of fruits and vegetables on a daily basis and their potassium intake was < 2 g/day.

Patients were counseled on a liberal K⁺ diet (2.4-3.5g per day) utilizing Tables 2 - 5. The meal plan was created from the Kansas Diet Manual, dividing the foods into categories based on potassium content. The food categories, which were developed prior to the National Renal Diet publication, were low K⁺ (5 – 150mg), medium K⁺ (150 – 250mg), high K⁺ (250 – 500mg), and very high K⁺ (>500mg). Portion sizes were emphasized in order to liberalize the amount of potassium consumed. The meal plan

Continued on page 5

encouraged two to three choices from each of the very-high, high-, and medium-K+ lists and one to two foods from the low-K+ list. The liberal K+ diet was reinforced on a monthly basis. Patients' verbal dietary recalls were recorded by the dietitian monthly over a 6 month period. Serum K+ levels were monitored monthly as well. Patients' K+ intakes were calculated from diet recalls using the Kansas Diet Manual, a reference of the Kansas Dietetic Association.

Table 2. Low Potassium Foods

Low K+ Foods: 5-150 mg per serving

Choose 1-2 of these foods daily:

Alfalfa sprouts	Apples	Blackberries
Cabbage	Eggplant	Fruit cocktail
Green beans	Plums	Sweet peppers
Raspberries	Radishes	Tangerines
Onions	Grapes	

Table 3. Medium Potassium Foods

Medium K+ Foods: 150 – 250 mg per serving

Choose 2-3 of these foods daily:

Broccoli	Apricots	Carrots
Grapefruit	Corn	Peaches
Okra	Pears	Zucchini
Strawberries	Turnips	Watermelon
Molasses	Pudding	Beets
Catsup	Chickpeas	
Juices: Apple and Grape		

Table 4. High Potassium Foods

High K+ Foods: 250-500 mg per serving

Choose 2-3 of these foods daily:

Artichoke	Apricots	Beet greens	Avocados	Parsnips
Banana	Oranges	Pumpkin	Cantaloupe	Tomatoes
Spinach		Kiwi	Lentils	Yogurt
Juices: Grapefruit and Orange				

Table 5. Very high Potassium Foods

Very High K+ Foods: >500 mg per serving

Choose 2-3 of these foods daily:

White potato	Peanut butter	Sweet potato	Nuts
Papaya	Tomato sauce		
Beans(except green and wax)			

Results

The mean pre-dietary K+ intake was 790 mg/day. The mean post-dietary K+ intake was 1635.6 mg/day. Overall, there was a mean increase in intake of potassium of 845.6 mg/day. The food sources that contributed to the increase in potassium intake which resulted in a net increase in serum potassium were bananas, orange juice, cantaloupe, tomato sauce, okra, potatoes, and tomatoes. No reasons were identified as to why some patients increased their K+ intake more than others except for patient preference.

According to their diet recalls, all patients increased dietary K+ intake by 10 – 50%. Results are shown in Table 6. The mean pre-serum K+ level was 3.2 mEq/L; the mean post-serum K+ level was 3.92 mEq/L resulting in an overall mean change in serum K+ levels of 0.72 mEq/L. This small, clinic-based study indicates that minor increases in dietary K+ without a K+ supplement can bring serum K+ levels into normal range even if K+ intake is under 2g per day.

Table 6. Pre and Post Potassium Intake and Serum Potassium Levels

Time Period (months)	# of Pts.	Pre Serum K+ Levels (mEq/L)	Pre K+ Intake (mg)	Post Serum K+ Levels (mEq/L)	Post K+ Intake (mg)	Average Increase in K+ Intake
1 – 6 months	5	3.0 – 3.4	150 – 1440	3.6 – 4.7	721 – 2457	41%

Discussion

All patients starting PD should be cautioned on risk of developing hypokalemia. Renal nutrition professionals should counsel patients starting PD on a 2.4 -3.5 gram K+ diet utilizing a list of low, medium, high, and very high K+ foods.

Some High K+ foods are also high in phosphorus such as ice cream, pudding, corn, lentils, yogurt, milk, beans (except wax and green), peanut butter, and nuts. When counseling patients with a low serum K+, renal nutrition professionals should caution patients about these foods (2).

If K+ levels do not increase or continue to decrease, this may be due to the following:

- 1) non-compliance with diet
- 2) extrarenal losses (e.g. gastrointestinal losses, acidosis, or excess sweating)
- 3) use of diuretic therapy

Continued on page 6

Potassium Mgmt.

continued from page 5

Alternatives to dietary management in correcting hypokalemia are increasing K⁺ concentration in peritoneal dialysate and potassium supplementation using pharmaceuticals, such as potassium chloride, K-Dur, and K-Tab (3).

When patients achieve a normal serum K⁺ levels through diet alone, they should be encouraged to continue consuming liberalized K⁺ diets. Patients should understand that even though their K⁺ levels are currently within normal limits, they are still at risk for hypokalemia if their K⁺ intakes decline.

References

1. Levine, DZ. *Caring for the Renal Patient*. Philadelphia, PA: W.B. Saunders Company; 1997.
2. Section K in Amick, BL, Lopes, GL. *Diet Manual*, Topeka, KS: Kansas Dietetic Association; 1992: 280 – 297
3. Williams, SR. *Nutrition and Diet Therapy*.. 8th Ed. St. Louis, MO: Mosby-Year Book, Inc.; 1993: 218 – 219, 618.

Congratulations to

Maryanne Meade,
MS, RD, CDN - SCAN, NE,
WM, DCE, RENAL, NCC, DDPD

on receiving the

Mary Abbott Hess Award
for Recognition of an
Innovative Culinary Effort



NOW AVAILABLE!
No Sugar Added Lemon Protein
and Fibre Cookie

Nutra/ Balance Products

7155 Wadsworth Way
Indianapolis, IN 46219
www.nutra-balance-products.com

**YOUR
ONE STOP
RENAL
NUTRITION
SOURCE**

NUTRABalance
NUTRITION AND GREAT TASTE!

FAMILY OF RENAL NOURISHMENTS

Nourishments that your Patients need!

A wide variety of Products from liquids to powders to cookies that helps your patient control their Electrolyte intake and enhance their protein and calorie needs.

Egg/Pro provides the highest quality biological protein available.

A broad line of Low Fluid, Low Electrolyte, Calorie and Protein fortified nourishment.

For your copy of "HEALTHY EATING FOR CHRONIC KIDNEY DISEASE" by Peggy Harum, RD, LD, call us today.

For Information or samples call. **1-800-654-3691**