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## Review Article

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

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## ABSTRACT

Hypokalaemia can be due to the absence of a cellular redistribution and low serum K<sup>+</sup> levels which can be secondary to inadequate dietary intake or extraneal losses (e.g. gastrointestinal or skin), or Renal losses. However a Serum K<sup>+</sup> secondary to low K<sup>+</sup> ingestion will usually occur after extended lengths of a low P.O. K<sup>+</sup> intake. Also, increased Renal K<sup>+</sup> excretion can be due to Mg deficiency. Patients on PD are at increased risk of Hypokalaemia vs. HD patients as PD patients with greater filtration of K<sup>+</sup>.

**Objective:** To prove that a diet with an increase of 10-50% K<sup>+</sup> can bring serum K<sup>+</sup> into normal range.

**Keywords:** Hypokalaemia; Potassium management; Peritoneal dialysis

## INTRODUCTION

Haemodialysis (HD) patients receive dialysis treatment 3 days per week while Peritoneal Dialysis (PD) patients receive Dialysis treatment every day. HD patients' K<sup>+</sup> levels usually run within normal limits 3.5 - 5.5 and sometimes greater than 5.5. However, PD patients' K<sup>+</sup> levels usually run within normal limits or < 3.5. K<sup>+</sup> levels are rarely > 5.5 in PD patients and usually secondary to poor Dialysis. Oftentimes when patients are pre-Dialysis and then start on HD there is emphasis on a low K<sup>+</sup> diet, however some patients change to PD and have been following a low K<sup>+</sup> diet and their serum Potassium levels drop. When counselled on a High K<sup>+</sup> diet many have explained that on HD they were told to follow a low K<sup>+</sup> diet. Therefore, patients switching from HD to PD are at risk of Hypokalaemia secondary to PD filters more K<sup>+</sup> and many patients were following a low K<sup>+</sup> diet pre-Dialysis and on HD. The ranges for Serum K<sup>+</sup> levels can be found in (Table 1). Hypokalaemia can be due to many different causes which are the following: 1) Absence of a cellular redistribution and low serum K<sup>+</sup> levels which can be 2ndry to inadequate dietary intake after an extended length of a low P.O. K<sup>+</sup> intake, 2) Malnutrition, 3) Prolong Gastrointestinal losses such as diarrheal, vomiting, or gastric suction, 4) Diuretics, 5) Diabetic Acidosis as the Potassium then goes into the Intracellular fluid, and 6) Magnesium Deficiency. Hyperkalaemia has its risks and symptoms; however Hypokalaemia also has risks and symptoms. Patients with a low serum K<sup>+</sup> level can have muscle weakness, abdominal distension, and irregular heart contractions. Hypokalaemia can lead to Central Nervous System changes with confusions and affective disorders. Sodium retention can occur which can lead to Metabolic Alkalosis.

## METHODS AND RESULTS

Five patients ages 18 - 60 with history K<sup>+</sup> levels < 3.5 were counselled on a High K<sup>+</sup> diet (2-3.5 grams which is the requirement for PD patients). Patient's diet recalls were taken over 6 months and lab results of serum K<sup>+</sup> levels were checked. Patients' K<sup>+</sup> intake were calculated from Diet recalls and all increased K<sup>+</sup> by 10-50% in diets. The results are shown in (Table 2).

## DISCUSSION

Study indicated that small increases in Dietary K<sup>+</sup> without a K<sup>+</sup> supplement can bring serum K<sup>+</sup> levels into normal range even if K<sup>+</sup> intake < 2grams. All patients starting Peritoneal Dialysis need to be made aware that they are at risk for Hypokalaemia. Therefore they need to be counselled on a 2 - 3.5 gram K<sup>+</sup> diet utilizing a list of Low, Medium, High, and very High K<sup>+</sup> foods. In order to see what foods need to be added to the diets see (Tables 3-6). The above High K<sup>+</sup> diet provides 2.4 - 3.5 grams of K<sup>+</sup>. Note: Some High K<sup>+</sup> foods are also high in phosphorous such as ice cream, pudding, corn, lentils, yogurt, milk, beans (except wax and green), peanut butter, and nuts. When

**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)

**Table 2:**

Period (months)	No. of pts.	Serum K <sup>+</sup> levels	Pre K <sup>+</sup> intake	Post K <sup>+</sup> intake	Post serum K <sup>+</sup> levels	Avg. increase in K <sup>+</sup>
1-6 months	5	3.0 - 3.4	150 - 1440mg	721 - 2457mg.	3.6 - 4.7	41%

**Table 3:**

Low K <sup>+</sup> Foods 5 - 150 mg.		
Recommend 1 - 2 of these foods		
Alfalfa sprouts	Apples	Blackberries
Cabbage	Eggplant	Fruit cocktail
Green beans	Plums	Sweet peppers
Raspberries	Radishes	Tangerines
Onions	Grapes	

**Table 4:**

Medium K <sup>+</sup> Foods (150 - 250 mg)					
Recommend 2 - 3 of these foods					
Broccoli	Apricots	Carrots	Grapefruit	Corn	Peaches
Okra	Pears	Zucchini	Strawberries	Turnips	Watermelon
Molasses	Pudding	Beets	Catsup	Chickpeas	
Juices: Apple and Grape					

**Table 5:**

High K <sup>+</sup> Foods (250-500 mg)						
Choose 2-3 of these foods:						
Artichoke	Apricots	Beet greens	Avocados	Parsnips	Banana	Oranges
Pumpkin	Cantaloupe	Tomatoes	Spinach	Kiwi	Lentils	Yogurt
Juices: Grapefruit and Orange						

**Table 6:**

Very High K <sup>+</sup> Foods (> 500 mg)						
Choose 2-3 of these Foods						
White potato	Peanut butter	Sweet potato	Nuts	Papaya	Tomato	sauce
Beans(except green and wax)						

counselling patients with a low serum K<sup>+</sup> make patient aware that these foods are high in Phosphorus.

If K<sup>+</sup> levels do not increase or continue to decrease that maybe due to the following:

- non-compliance with diet
- Extraneal losses (e.g. gastrointestinal, skin or renal losses).
- Use of Diuretic.

Other alternatives to increasing Serum K<sup>+</sup> are the following:

- A K<sup>+</sup> controlled diet of 2 - 3.5 grams can be recommended (information can be received from the American Dietetic Association)
- Dialysate K<sup>+</sup> increased in PD.
- A K<sup>+</sup> supplement can be recommended by the Physician.

- Types of K<sup>+</sup> Supplements often used: Potassium Chloride, K-Dur, and K-Tab.

When patient achieves a normal serum K<sup>+</sup> level through diet alone (range of 3.5 - 5.5), patient should be encouraged to continue to comply with diet. Patients need to be made aware that even though K<sup>+</sup> level now within normal limits, they are still at risk for Hypokalaemia.

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