



A Dietary Alternative To Phosphorus Control

Lynn M. Taylor, MS, RD, LD and Ted Markewich, BA

Davita Carroll County Dialysis



INTRODUCTION

Hyperphosphatemia and low albumin levels are independently associated with increased morbidity and mortality in hemodialysis patients. Balancing the intake of adequate protein with a low phosphorus diet is a challenge for dialysis patients due to the inherent high phosphorus content of animal protein foods. Egg whites, either liquid or powdered form, are a good source of protein and provide the added benefit of being very low in phosphorus compared to other animal protein sources. For example, 7 grams of protein in egg white contains 8 mg phosphorus compared to 60 mg phosphorus in 7 grams of beef protein.

This study investigated the effect on the serum phosphorus and albumin levels in dialysis patients who replaced the protein source in one meal per day from meat protein to pasteurized egg white substitute.

METHODOLOGY

This study included hemodialysis patients in a suburban outpatient dialysis center ages 35-85, on dialysis \geq 3 months with serum phosphorus $>$ 3.9 mg/dl, and no reported allergy to eggs. We chose a pasteurized liquid egg white product (All Whites[®]) that contained no added phosphorus (24 grams of protein and 28 mg of phosphorus).

For six weeks, patients consumed 8 ounces of All Whites[®] during one meal per day in which meat would normally be consumed. Recipe ideas were provided for smoothies and for cooking. The patients kept a daily meal diary for the duration of the study using a pictorial food log. Phosphorus binder intake was recorded.

For each patient, serum phosphorus and albumin measurements collected at baseline were averaged and compared to the average measurements collected at follow-up. A paired t-test was used to determine if there was a significant decreases in outcomes and the Wilcoxon signed-ranks test was used to confirm the paired t-test.

RESULTS

Thirteen patients (6 male and 7 female), average age of 62 years, completed this study. The phosphorus binder intake remained stable throughout the study at an average of 6.4 pills per day. A total of 92% had a decrease in phosphorus serum level when they substituted pasteurized liquid egg white for meat in one meal per day for six weeks. The key findings are presented in Table 1.

- The phosphorus serum levels decreased with the substitution of the egg white product.
- The albumin levels were not affected by the substitution of consumption egg white for meat in a meal.
- The reported phosphorus intake decreased significantly with the use of egg white product.
- The phosphorus binder intake remained constant during the study.
- No unusual elevation of serum potassium was observed (data not shown).

Table 1: Summary Results

Measurement	N	Baseline Mean	Study Phase Mean	Standard Deviation of the Difference	Paired t-test P value	Wilcoxon Signed-Ranks Test P value
Phosphorus (mg/dL)	13	5.54	4.63	0.753	0.001	<0.001
Albumin (mg/dL)	13	4.02	4.08	0.312	0.491	0.539
Reported Phosphorus (mg/day)	12	692	572	95.54	0.001	0.003
Phosphorus Binder Intake (# pills)	13	6.63	6.42	1.305	0.571	0.733

CONCLUSIONS

- The incorporation of 8 ounces of liquid pasteurized egg white product providing 24 grams of protein is tolerated as a protein substitute for one meal a day in hemodialysis patients.
- Pasteurized liquid egg white products offer a large variety of cooking and preparation styles.
- Pasteurized liquid egg whites are an effective component of the renal diet for lowering serum phosphorus while maintaining the albumin level.

ACKNOWLEDGEMENT

We thank the DaVita Clinical Research Grant Program for funding and supporting this work. We also thank the staff of Carroll County Dialysis who assisted in this study. Special thanks to Dr. Robert Levy M.D., for encouraging this research.

For more information, contact Lynn Taylor M.S., R.D.,L.D. at Carroll County Dialysis, 412 Malcolm Drive, Westminster MD 21157, Lynn.Taylor@Davita.com or Tmark@carr.org.

DAILY MEAL DIARY

• Circle the picture of food items eaten today, then enter the portion eaten.
• Be very specific in your estimate of the amount eaten.

MILK _____ c.	YOGURT & PUDDING _____ c.	ICE CREAM _____ dips	CHOCOLATE (any) _____ oz.	COLA _____ oz.
WHOLE EGGS _____ ea.	PANCAKES _____ ea.	BISCUITS _____ ea.	WHOLE GRAIN BREADS (any) _____ sl.	PEANUT BUTTER _____ lbs.
BEEF _____ oz.	PORK _____ oz.	CHICKEN _____ oz.	SEAFOOD _____ oz.	LIVER & ORGAN MEATS _____ oz.
HOT DOGS, SAUSAGE, & PROCESSED MEATS _____ oz.	PIZZA _____ sl.	MACARONI & CHEESE _____ c.	CHEESE _____ sl.	CREAM SOUP, CHILI, SOUP WITH BEANS _____ c.
		NUTS (any) _____ c.	BEANS (except green & wax) _____ c.	

Circle meals eaten today and enter the number of binders taken with each meal.

PHOSLO	RENAGEL	OTHER
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

All Whites Meal
Enter the number of the All Whites recipe you ate today:
Circle the meal in which you ate All Whites today:
Breakfast _____ Lunch _____ Supper _____

© 2008 PHOSPHORUS CONTROL RESEARCH STUDY / FALL 2008