

A Long Road to Travel: Adherence to Dietary Recommendations and Adequate Dietary Phosphorus Control



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DIETARY COUNSELING AND nutritional interventions are cornerstone components in the management of patients undergoing dialysis. Dietitians and nephrologists recommend a number of dietary restrictions related to phosphorus, potassium, sodium, fluid intake, and select macronutrients. They also emphasize the importance of high energy and dietary protein intake to maintain adequate nutritional status. Notwithstanding the clinical importance of these practices, the adherence to such recommendations is difficult and challenging for most patients.

In this issue of the *Journal*, Desiree Luis-Rodriguez et al.¹ report on *dietary quality and adherence to dietary recommendations* in a single hemodialysis center from the Canary Islands, Spain. By evaluating 3-day dietary records, the authors report a very low adherence to current nutritional guidelines despite frequent physician and dietitian counseling. Seventy percent of patients did not meet daily energy requirements, and 50% consumed insufficient protein. Dietary fat was primarily unhealthy (saturated fat) and in excess, and most patients also consumed excessive amounts of phosphorus, calcium, and sodium. Moreover, fiber intake was low, and in general, the overall quality of the diet was poor. Although we should interpret this data in view of the limitations of the study and underreporting potential of dietary recalls,² this panorama is disheartening. It is, unfortunately, not exclusive of these Islands, as it echoes reports from other countries³⁻⁶ as well as probably the clinical experience of many of the readers. Ultimately, these studies likely reflect, in addition, the global progressive shift toward more Western dietary patterns worldwide. Recently, potential barriers to patients following the hemodialysis diet were evaluated through structured patient interviews.⁷ Issues of time and food preparation (e.g., difficulty in finding the right foods when shopping and an inability or lack of time to cook

healthy foods) and behavioral factors (e.g., being too tired to cook, feeling deprived with dietary restrictions, or poor appetite) tended to be most deterministic of poor adherence. The primary approach of teaching patients about the dietary sources of key nutrients, although necessary, may not be sufficient to help them adhere to the restrictions. Self-reflection needs to be made on whether physicians emphasize the importance of phosphorus control adequately in their daily practice. Regrettably, it appears that the renal dietitian's primary role of providing nutrition assessments and counseling is being heavily expanded to include administrative and coordination responsibilities,⁸ which hamper even more our capacity to do good for our patients. Patient education and motivation are key to meeting nutrient needs, and interesting opportunities continue to emerge with the use of modern technologies, electronic applications, distance coaching, and self-management programs^{9,10}; however, to our knowledge, these have been little studied or implemented to date.

Although certainly not the only nutrient to target in dialysis patients, phosphorus is probably the most popular nowadays in view of its role in mineral-bone homeostasis, vascular calcification, and its strong association with poor patient outcomes.¹¹ In this issue, two articles discuss the dual management strategies of dietary phosphorus intake. First, St-Jules et al.¹² reexamine the phosphorus-protein dilemma and provide a summary of practical dietary recommendations to restrict phosphorus intake. Dietary phosphorus restriction practices have sometimes been met with opposition, given that just simple restraint of foods without education about alternative low-phosphorus food sources can lead to a reduction in animal protein, which may be detrimental in dialysis patients. This reduction in protein intake, together with concurrent protein losses in the dialysate and inflammation-induced hypermetabolism, may promote the appearance of protein-energy wasting.¹³ Recent surveys to renal care professionals provided evidence that knowledge gaps exist regarding dietary phosphorus among both patients and caregivers.¹⁴ Although many health care professionals feel that during recent years, there has been increasing awareness among dialysis patients of the phosphorus content of foods, there is also a strong feeling that patients continue to experience difficulties when attempting to achieve phosphorus targets.¹⁵ In a recent analysis of three dialysis centers in the United States, about 40% of interviewed

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patients did not, in fact, adhere to low-phosphorus dietary recommendations.¹⁶

A number of possibilities to limit phosphorus intake without inferring on malnutrition risk are available. These include boiling meat in water to significantly reduce its phosphorus content while maintaining protein content; soaking meat in cold water for 1 hour before boiling to reduce its phosphorus content even more^{11,17}; and choosing commercial food items that have been prepared without phosphorus-containing food additives. The latter possibility is likely the most important approach because food additives have been estimated to increase the phosphorus content by 60% on average. Of importance is that this not only affects the total phosphorus content but also the sodium content.¹⁸ This is, however, hampered by the increased costs of such products and by the reluctance of the food industry to adequately label the products for proper quantification. Reports such as that of Lindley et al.¹⁹ regarding phosphorus content in wine, beer, and soft drinks clearly illustrate this problem while appearing as an important encyclopedic resource to guide evidence-based patient recommendations.

The other side of the coin in dietary phosphate control pertains to the use of phosphate binders. Poor adherence to phosphate binders is widespread and reported to range between 22% and 74% (mean 51%) in studies of dialysis patients worldwide.²⁰ High pill burden in this often elderly and comorbid population is an important contributor,¹⁶ together with oblivion, confusion in dosing in coordination with meals, concerns about side effects, and low health literacy.²¹ Joson et al.²² report in this issue on *patient-reported factors associated with poor phosphate binder adherence* in a single hemodialysis center from California, the United States. By contrasting serum phosphorus control with the patient's knowledge of dietary phosphorus sources and a medication adherence scale, they illustrated yet another daunting panorama—a total of 61% of patients reported unintentional medication nonadherence and 48% reported intentional medication nonadherence. Phosphorus-specific knowledge was low, with barely 50% of patients able to name two high-phosphorus foods. However, in conjunction, self-reported binder nonadherence was the strongest determinant of poor serum phosphorus control. Short-term symbolic rewards, such as financial incentives²³ and strategies to improve self-motivation,²⁴ are examples to support adherence to therapy. Patient actions are, in part, influenced by our collective efforts to inform them about the harmful effects of excessive dietary phosphorus intake on health outcomes. Provision of pill boxes or calendar-based dispensers to help them track their daily medications is useful in other contexts, but the nature of phosphorus binder dosing requires a more sophisticated approach.

Collectively, the articles in this issue illustrate the need for an interdisciplinary team approach to manage phosphorus control in dialysis patients. This requires the

coordinated efforts of physicians, dietitians, nurses, and pharmacists in tackling both the dietary and pharmacologic battlefronts of phosphorus control. In the United Kingdom and in some parts of the United States, renal dietitians take the lead in developing and implementing protocols for managing mineral-bone disease. They work closely with the nephrologist to modify the prescription, taking into consideration the patient-specific dietary habits and adherence practices of the patient. With continuous and collaborative efforts, we should find shortcuts in this long road we travel to develop solutions to effectively manage mineral-bone disease that will lead to better outcomes for our patients.

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