

# CKD: Risk Before, Diet After

**Q** When I see a patient for an annual physical or gynecologic exam (or even just to give a flu shot), I try to encourage healthy living. Are there any CKD statistics I can use to “encourage” my hypertensive or overweight patients to follow a better plan of care?

According to a recent study by McMahon et al, risk factors for chronic kidney disease (CKD)—including hypertension, dyslipidemia, and diabetes—may be present up to 30 years prior to diagnosis of CKD.<sup>1</sup> Since these risk factors are modifiable, the researchers concluded that early intervention could lead to a reduction in new CKD cases.<sup>1</sup>

Using data from the Framingham Offspring Study, the researchers identified 441 patients with incident CKD and then matched them with a control group of 882 patients who did not develop CKD during the 30-year study period. Subjects who eventually developed CKD were more likely than their counterparts to have hypertension (odds ratio [OR], 1.76), obesity (OR, 1.71), and elevated triglyceride levels (OR, 1.43) 30 years prior to CKD diagnosis. Having diabetes nearly tripled a patient’s likelihood of developing CKD within 20 years (OR, 2.90).<sup>1</sup>

Early identification of these risk factors and treatment of affected patients is imperative to help prevent kidney disease. Regular screening of young and middle-aged adult patients, as well as early intervention when risk factors are identified, should slow not only the progression of these detrimental conditions but also the development of CKD. —JH

**Q** In my admitting orders for a CKD patient, I wrote for a “renal diet.” However, the nephrology practitioners changed it to a DASH diet. What is the difference? Why would they not want a “renal diet”?

The answer to this question is: It depends—on the patient, his/her comorbidities, and the need for dialysis treatments (and if so, what type he/she is receiving). *Renal diet* is a general term used to refer to *medical nutrition therapy* (MNT) given to a patient with CKD. Each of the five stages of CKD has its own specific MNT requirements.

The MNT for CKD patients often involves modification of the following nutrients: protein, sodium, potassium, phosphorus, and sometimes fluid. The complexity of this therapy often confuses health care professionals when

a CKD patient is admitted to the hospital. Let’s examine each nutrient modification to understand optimal nutrition for CKD patients.

**Protein.** As kidneys fail to excrete urea, protein metabolism is compromised. Thus, in CKD stages 1 and 2, the general recommendations for protein intake are 0.8 to 1.4 g/kg/d. As a patient progresses into CKD stages 3 and 4, these recommendations decrease to 0.6 to 0.8 g/kg/d. In addition, the Kidney Disease Outcomes Quality Initiative (KDOQI) and the Academy of Nutrition and Dietetics recommend that at least 50% of that protein intake be of high biological value (eg, foods of animal origin, soy proteins, dairy, legumes, and nuts and nut butters).<sup>2</sup>

Why the wide range in protein intake? Needs vary depending on the patient’s comorbidities and nutritional status. Patients with greater need (eg, documented malnutrition, infections, or wounds) will require more protein than those without documented catabolic stress. Additionally, protein needs are based on weight, making it crucial to obtain an accurate weight. When managing a very overweight or underweight patient, an appropriate standard body weight must be calculated. This assessment should be done by a registered dietitian (RD).

Also, renal replacement therapies, once introduced, sharply increase protein needs. Hemodialysis (HD) can account for free amino acid losses of 5 to 20 g per treatment. Peritoneal dialysis (PD) can result in albumin losses of 5 to 15 g/d.<sup>2</sup> As a result, protein

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**Renal Consult** is edited by **Jane S. Davis, CRNP, DNP**, a member of the *Clinician Reviews* editorial board, who is an NP in the Division of Nephrology at the University of Alabama at Birmingham and is the communications chairperson for the National Kidney Foundation’s Council of Advanced Practitioners (NKF-CAP); and **Kim Zuber, PA-C, MSPS, DFAAPA**, who is a PA with Metropolitan Nephrology in Alexandria, Virginia, and Clinton, Maryland; she is also past chair of the NKF-CAP. This month’s responses were authored by **Joanne Hindlet, ACNP, CNN-NP**, who practices at Houston Nephrology Group, and **Luanne DiGuglielmo, MS, RD, CSR**, who practices at DaVita Summit Renal Center in Mountainside, New Jersey, and is the Clinical Coordinator for the Dietetic Internship at the College of Saint Elizabeth in Morristown, New Jersey.

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needs in HD and PD patients are about 1.2 g/kg/d of standard body weight. It has been reported that 30% to 50% of patients are not consuming these amounts, placing them at risk for malnutrition and a higher incidence of morbidity and mortality.<sup>2</sup>

**Sodium.** In CKD stages 1 to 4, dietary sodium intake should be less than 2,400 mg/d. The Dietary Approaches to Stop Hypertension (DASH) diet and a Mediterranean diet have been associated with reduced risk for decline in glomerular filtration rate (GFR) and better blood pressure control.<sup>3</sup> Both of these diets can be employed, especially in the beginning stages of CKD. But as CKD progresses and urine output declines, recommendations for sodium intake for both HD and PD patients decrease to 2,000 mg/d. In an anuric patient, 2,000 mg/d is the maximum.<sup>2</sup>

**Potassium.** As kidney function declines, potassium retention occurs. In CKD stages 1 to 4, potassium restriction is not employed unless the serum level rises above normal.<sup>2</sup> The addition of an ACE inhibitor or an angiotensin II receptor blocker to the medication regimen necessitates close monitoring of potassium levels. Potassium allowance for HD varies according to the patient's urine output and can range from 2 to 4 g/d. PD patients generally can tolerate 3 to 4 g/d of potassium without becoming hyperkalemic, as potassium is well cleared with PD.<sup>2</sup>

**Phosphorus.** Mineral bone abnormalities begin early in the course of CKD and lead to high-turnover bone disease, adynamic bone disease, fractures, and soft-tissue calcification. Careful monitoring of calcium, intact parathy-

roid hormone, and phosphorus levels is required throughout all stages of CKD, with hyperphosphatemia of particular concern.

In CKD stages 1 and 2, dietary phosphorus should be limited to maintain a normal serum level.<sup>2</sup> As CKD progresses and phosphorus retention increases, 800 to 1,000 mg/d or 10 to 12 mg of phosphorus per gram of protein should be prescribed.

Even with the limitation of dietary phosphorus, phosphate-binding medications may be required to control serum phosphorus in later CKD stages and in HD and PD patients.<sup>2</sup> Limiting dietary phosphorus can be difficult for patients because of inorganic phosphate salt additives widely found in canned and processed foods; they are also added to dark colas and to meats and poultry to act as preservatives and improve flavor and texture. Phosphorus additives are 100% bioavailable and therefore more readily absorbed than organic phosphorus.<sup>4</sup>

**Fluid.** Lastly, CKD patients need to think about their fluid intake. HD patients with a urine output of > 1,000 mL/24-h period will be allowed up to 2,000 mL/d of fluid. (A 12-oz canned drink is 355 mL.) Those with less than 1,000 mL of urine output will be allowed 1,000 to 1,500 mL/d, with anuric patients capped at 1,000 mL/d. PD patients are allowed 1,000 to 3,000 mL/d depending on urine output and overall status.<sup>2</sup> Patients should also be reminded that foods such as soup and gelatin are counted in their fluid allowance.

The complexities of the "renal diet" make patient education by an RD critical. However, a recent



The National Kidney Foundation Council of Advanced Practitioners' (NKF-CAP) mission is to

serve as an advisory resource for the NKF, nurse practitioners, physician assistants, clinical nurse specialists, and the community in advancing the care, treatment, and education of patients with kidney disease and their families. CAP is an advocate for professional development, research, and health policies that impact the delivery of patient care and professional practice. For more information on NKF-CAP, visit [www.kidney.org/CAP](http://www.kidney.org/CAP)

article suggested that MNT for CKD patients is underutilized, with limited referrals and lack of education for primary care providers and RDs cited as reasons.<sup>5</sup> This is mystifying considering that Medicare will pay for RD services for CKD patients.

The National Kidney Disease Education Program, in association with the Academy of Nutrition and Dietetics, has developed free professional and patient education materials to address this need; they are available at <http://nkddep.nih.gov/>. —LD **CR**

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