

## Nutrition Intervention is effective in mitigating protein-energy wasting (PEW) and improving outcomes in patients with chronic kidney disease (CKD)

“Protein-energy wasting (PEW), which is manifested by low serum levels of albumin or prealbumin, sarcopenia and weight loss, is one of the strongest predictors of mortality in patients with chronic kidney disease (CKD).”

“The literature indicates that PEW can be mitigated or corrected with an appropriate diet and enteral nutritional support that targets dietary protein intake.”

For the general public, overnutrition and obesity is a major public health concern. In contrast, for patients with chronic kidney disease (CKD), especially those on dialysis, malnutrition or protein-energy wasting (PEW) is a primary concern. PEW is the strongest risk factor for adverse outcomes and mortality. Evidence indicates that surrogates of PEW, such as low serum albumin level or inadequate protein intake, correlate with mortality. Approximately two thirds of all patients on dialysis in the US exhibit hypoalbuminemia with a serum albumin level of <4.0 mg/dl. Improving nutritional status by dietary and nondietary interventions is an important step toward improving outcomes in these patients.

Recently, a group of expert nephrologists in nutrition published a review paper on the importance of diet and nutrition support in improving outcomes in patients with CKD. These experts believe that nutrition intervention can increase serum albumin levels or correct PEW in CKD patients and subsequently improve quality of life and survival. For this review, these experts examined the current nutritional intake of dialysis patients as well as clinical trials that studied the effects of nutritional

interventions in malnourished dialysis patients. The experts have also provided a proposed algorithm for nutritional support in CKD patients.

The recommended energy and protein intakes for dialysis patients are high, and many patients are not meeting the recommendations. The recommended dietary energy intake (DEI) for patients on hemodialysis and peritoneal dialysis is 30-35 kcal/kg per day. The recommended dietary protein intake (DPI) is 1.2 g/kg per day for hemodialysis patients and 1.3 g/kg per day for peritoneal dialysis patients. Most patients on dialysis, however, have a lower DEI and DPI than the recommendations. Data show that the average DEI is  $23.2 \pm 9.5$  kcal/kg per day and the average DPI is  $0.96 \pm 0.43$  g/kg day. Oral nutritional supplements can provide an additional 7-10 kcal/kg per day of energy and 0.3-0.4 g/kg per day of protein, which helps make it possible to meet the recommended targets of both DEI and DPI. To reach the recommended energy and protein levels, oral nutritional supplements should be given 2 to 3 times per day, preferably one hour after main meals.

Reference: Kalantar-Zadeh K, et al. *Nat Rev Nephrol.* 2011;7:369-384.

“Although PEW might be engendered by non-nutritional conditions, such as inflammation or other comorbidities, the question of causality does not refute the effectiveness of dietary interventions and nutritional support in improving outcomes in patients with CKD.”

Improved nutritional status and other clinical outcomes are seen in over 30 clinical trials of nutrition support in dialysis patients. The studies examined the effects of various forms of nutrition support including oral nutritional supplementation, intradialytic nutrition, and in-center meals. The research has shown positive outcomes including improvements in body weight, serum protein levels, nutritional status, and dietary energy and protein intake.

An intervention of interest is the provision of in-center meal and oral nutritional supplements. Inadequate food intake, especially on hemodialysis treatment days, is common in patients. In addition, some dialysis centers in the US have strict rules against eating and drinking during dialysis treatment. However, providing in-center meals and supplements can actually have anabolic benefits, improve nutritional intake, and increase patient adherence and satisfaction. It can also provide an educational opportunity for dialysis healthcare professionals to educate and highlight the importance of healthy meal options and the importance of adherence to dietary recommendations.

Based on the evidence, these experts propose an algorithm for nutritional support in CKD patients to help improve nutritional status, dietary energy and protein intake, and serum albumin levels. The algorithm suggests

that for patients who are at nutritional risk, CKD-specific oral nutritional supplements should be started and given 1-2 times per day during dialysis treatments and at home. It is also recommended to try a MedPass approach to oral nutritional supplements, in which patients drink small amounts of a protein-rich oral nutritional supplement with prescribed medications instead of water. This approach has been shown to improve outcomes in other patient groups.

*Providing in-center meals and oral nutritional supplements to patients with CKD is the most promising way to increase serum albumin and improve longevity and quality of life in this patient population.*

As healthcare and dialysis treatments continue to change in the US, in-center meals and oral nutritional supplements need to be included in patient care. There is a consistent and strong association between nutritional status and serum albumin levels with mortality in CKD patients. The provision of nutrition support through in-center meals and oral nutritional supplements is an inexpensive and effective strategy to help improve outcomes in these patients.

## Nutrition Conclusion

Patients with CKD who are at nutritional risk should receive a renal-specific oral nutritional supplement 1-2 times per day to improve outcomes.