"Kidneys and Kale: Preventative Kidney Care with Plants"

Webinar Questions Answered by AnnaMarie Rodriguez, RD, LDN, FAND

Please note that these are brief answers to complex questions and are not meant as medical advice. Please seek medical advice from your personal healthcare professional for more complete information.

- What are keto analogs and which population should take them?
  - Ketoanalogues (KA) are amino acid supplements without the nitrogen side chain, thus will not contribute to excess waste in the blood while still providing amino acid 'building blocks'. KDOQI Clinical Practice Guideline for Nutrition in CKD: 2020 Update provided extremely favorable rating for adults stages 3-5 (non-dialyze) to prescribe a LPD of 0.55-0.6 g/kg body weight/day *or a VLPD providing 0.28-0.43 g/kg with additional keto acid/amino acid analogs to meet 0.55-0.6 g/kg/day (Rating: 1A)*
  - There are additional studies of KA being used with LPD (Wu et al., 2017) and use of KA with VLPD in persons undergoing incremental twice weekly dialysis to preserve residual renal function (Zhang et al., 2014)
- When following a low protein diet, isn't there increased muscle loss for the elderly?
  - Between ages 30-70 there is a subtle loss of skeletal muscle mass, replaced by fat (up to 20%) and this blunts the anabolic response to feeding and exercise (Sarcopenia). Considering diminished kidney function the use of the PLADO recommendations whereas .6 - .8g/kg (EAR is .66, & RDA is 0.8g.kg) with >50% is of plant protein is sufficient provided caloric needs are met. Wu et al utilized n LPD + KAs to maintain adequacy in meeting protein needs while preserving kidney function. Some research indicates older adults may need 1.0 -1.2g/kg and I do have patients I encourage to eat a higher protein (wounds, HIV, etc.) and I encourage to use at least 50% or > from plant-based sources to minimize low grade acid accumulation. In an article by Putra et al., (2021) "A tailored nutrition approach to provide adequate protein (1.2 g/kg body weight/day), from a mix of sources, and supplementing sufficient leucine may offset these risks." Here is the link for further reading (good article): Protein Source and Muscle Health in Older Adults: A Literature Review - PMC (nih.gov)
  - Considering loss of kidney function, PLADO, the LPD or VLPD with KA is promoted to prevent further damage to the kidney; I like to take a realistic approach of the upper limits of PLADO and the use of KAs can be beneficial for this population..
- One place says 0.6-0.8 / KG BW and other place says 0.6-0.8/KG IBW (my typo – apologies) - which one should be followed?
  - BW!
- For people who work out and are trying to maintain higher muscle mass with CKD stage 3/4 do you still recommend only 0.6gm/kg protein?
  - .6 up to .8g/kg with >50% from plant sources. This is an interesting question! One of the 'rules' for maintaining healthy kidneys is to maintain an active lifestyle. Working out, weightlifting, etc. can influence creatinine (possible elevation). This to me would be an exciting opportunity to engage and adjust intake with close monitoring of biochemical parameters and if protein needs may need to be increased to meet anabolic demands the use of KAs would be safer as there is no nitrogenous waste to increase waste.
- Are all these g/kg recommendations based on ideal body weight or do you recommend adjusting for obesity?
  - Actual body weight: the use of ABW for persons who are <95% or >115% has been shown to under- or overestimate and there is insufficient evidence to justify its use. It is imperative though

to use critical thinking in events of critical illness where there may be the presence of ascites or edema.

- Please share any nutrition guidelines for adults with CKD, stage 3-5 who also have large, complex wounds, diabetic foot ulcers, and other wounds?
    - Again: excellent question and I am glad you asked this as we do not have nearly enough time in one hour to cover all areas! Although we want to use an LPD or VLPD to preserve kidney function there is the caveat of this: With the protein restrictions there is the additional verbiage "who are metabolically stable". What does this elucidate? In the context of the LPD or VLPD recs the patient must not have the presence of inflammatory or infectious diseases, no hospitalization within 2 weeks, the absence of poorly controlled diabetes, cancer, or precipitous weight loss. Additionally, this will include the patient to be free from use of immunosuppressive medications or antibiotics. Once the patient is stable then a LPD can be initiated and I personally prefer to initiate this slowly using the PLADO primarily and as patients exhibit both tolerance, acceptance, and capability to adhere, to transition to a reduced protein intake (LPD or VLPD with KAs).
- What does WG stand for?
    - Whole grains
- How was risk of CKD measured in studies, i.e., the slide on "Participants in highest quartile of plan protein intake exhibited 30% lower risk of CKD"?
    - The Tehran Lipid & Glucose Study: risk was measured by GFR.
    - MESA Study: microalbuminuria (urinary albumin excretion), also reviewed creatinine & GFR.
    - Singapore Chinese Health Study: This is a fantastic study; prospective population-based cohort that recruited 63,257 Chinese adults aged 45–74 years from 1993 to 1998. Habitual diet information *via* a validated semiquantitative food frequency questionnaire was collected and identified ESRD *via* record linkage with a nationwide registry.
    - ARIC Study: Use of GFR; all these studies are intriguing.
        - All these study citations are included on the PDF of citations too!
- How do we count the carbs in plant foods in people with diabetes? Do we count beans as a protein or carb in a diabetic diet?
    - Bean/Peas/Legumes are so amazing that they meet so many nutrient needs + fiber! Count as protein, but also take the carb content into consideration! This can be of particular importance for considerations with weight management as well. I often find that portion sizes are significantly instrumental when educating clients. Example ½ cup cooked pinto beans is ~7g protein & ~22g carb → I do note that some sources have variances (USDA database)
- Do you feel that the current diet trend of a high protein diet for weight loss may eventually lead to a higher incidence of ESRD?
    - Yes, we already see this. The SAD (Standard American Diet) or Western is very high in protein or animal origin, high in fat, Na, sugar, low in fiber, and is heavily processed. This sets us up for a host of chronic diseases: obesity (which lends to both CVD, HTN DM, and more), heart disease hypertension, diabetes, metabolic syndrome, and all of which increases risks for CKD. I recall one of my favorite National Nutrition Month slogans as it related to balance, variety, and moderation. One of the problems with the Western diet goes beyond the food choices; it is portion sizes. We (generally speaking) simply eat more than our bodies require.
- What are your thoughts on a high protein vegan diet (~1.2-1.6 g/kg and up to 2 g/kg) for the prevention of kidney disease? And how would a high protein vegan diet affect kidney disease progression in those who already have it?
    - This is an intriguing area of interest for me beyond being a dietitian and beyond counseling persons in all walks of life as I personally am very cautious with a declining GFR and vegan. Typically, the protein foods that are plant-based are not only alkaline, but also high in fiber

which is additionally kidney protective. However, excess protein, no matter the source, can cause intraglomerular hypertension which over time results in hyperfiltration, glomerular injury, and proteinuria (an indicator of kidney damage). I feel there is definitely 'wiggle room' for people adhering to a vegan diet. It is well documented that plant-based nutrition is kidney protective for many of the reasons we reviewed, alkalinity, microbiome/toxins, fiber, etc. though I will be the first to say there is no solid evidence that states a vegan diet providing upward of 2g/kg would be kidney protective. The avg protein intake for vegans is ~1.0g/kg which is still higher than the RDA; here is a article that lends insight to how much protein is consumed by vegans & vegetarians: Dietary Protein and Amino Acids in Vegetarian Diets—A Review - PMC (nih.gov) . Of note, I had completed a recall to see where I was at to estimate if I was adhering to recommendations for a LPD and I found my intake was ~.8g/kg; the important takeaway is to use a high intake of fresh, whole foods!

- Do you have any data on predominantly plant-based diets that don't include low fat dairy, but normal fat dairy?
    - There is a recent study (published in 2022) that indicates high fat dairy products may decrease the risk of CKD incidence and the data is very robust with a good sample size. It is important to note though that this is regarding incident patients and not applicable to persons who have kidney disease. It will be interesting to see additional data. Of note, this study was conducted within the Tehran Lipid and Glucose Study which we reviewed during our education! Here is the link of this study on high-fat dairy products: High-Fat Dairy Products May Decrease the Risk of Chronic Kidney Disease Incidence: A Long-Term Prospective Cohort Study - Journal of Renal Nutrition (jrnjournal.org)
- For eggs is it a per gram or one egg serving size.
    - 1 egg will be the equivalent of 1 ounce of meat or 6g of protein; the egg yolk will have more acidic properties.
- Did Storz and Ronco include supplements in their assessment of meeting calcium and vitamin D requirements?
    - The assessment of the energy & nutrient intakes was based on dietary intake only, thus no consideration for any supplementation.
- What g/kg protein recommendations would you use for a patient who has a cancer diagnosis and receiving treatment who also has CKD stage 3-5 not on dialysis?
    - The LPD or VLPD should not be implemented in persons who are not metabolically stable. Often with a liberalized diet, patients still struggle to meet needs; the Mediterranean diet is a more liberal approach and if we really think about it, the PLADO diet is similar in nature to the DASH or Mediterranean diet. I might suggest a minimum of 1.0g/kg and this may vary dependent on the treatments the patient is going through. There are many factors affecting the actual intake and patients are typically struggling to meet their needs which is why I do like the Mediterranean diet (if the patient is not used to following a plant-based diet) and liberalized, with use of an ONS if needed. I err on the side of being realistic and helping the patient identify the foods they can best tolerate to maximize meeting their needs. Once the patient is stabilized, they slowly implement LPD. Here is a nice article that has helpful tips: Navigating a Chronic Kidney Disease Diet for Individuals With Cancer - Journal of Renal Nutrition (jrnjournal.org)
- How are soybeans as a plant source of protein for someone prone to oxalate kidney stones?
    - Soybeans are considered a 'high oxalate' bean and although they do contain some oxalate, they also contain phytate which is advantageous. If the person is prone to oxalate stones it might be best to choose from low oxalate beans such as chickpeas, red beans, butter beans, or kidney beans.
- Are there other tips for keeping potassium low while getting enough protein?

    - If using an LPD or the PLADO diet this is not problematic as the fiber naturally facilitates K+ excretion and both approaches will meet protein needs. The higher the fiber, the better. It is worthwhile noting that education on K+ rich sources and portion sizes is necessary, if a patient presents with chronic hyperkalemia there are medications that can be used to maintain K+ levels while allowing patients to enjoy a robust intake of fruits and vegetables. These are referred to as K+ 'binders' such as Veltassa, Lokelma, or Kionex; the K+ is bound to the medication and passed in the stool. When I first started working with CKD & ESKD we used Kayexalate, however the treatment had vastly improved, thankfully.
- Is there an increase absorption % of potassium based on inorganic source, similar to phosphorus?
    - Yes, absolutely. The additives/preservatives such as sodium, phosphorus, potassium, calcium salts are not protein-bound and readily dissociate in the gut making them readily absorbed (90-100%). The molecular structures are simple and because they are not 'bound' within the fiber or tissue they are absorbed rapidly.
- In my practice, I am dealing with the opposite of the plant-based diet. The so-called "Carnivore" diet is becoming more and more popular. I have clients interested in learning more about it and some who have already jumped on the bandwagon and follow various MD's promoting it on the internet or other groups providing information about it to laypeople. Some have been following for years! As an RD, I am not a fan of following a carnivore diet. How do you as an RD handle this topic with stubborn clients as far as educating them to the increased health risks involved in following a carnivore diet long-term?
    - This is very difficult as the internet, social media, is literally packed with advertising and education that is not reliable/credible. Sadly, our patients crave a rapid solution to their problems and one that promises to correct 'everything'. Often the letters "MD" makes it 'right' to our patients. The approach I take with a plant-based eating plan: that it does fix 'everything'. I like the 5 A's approach to patient centered care as it shifts the focus to the patient and their desires. There are occasionally people who find it very difficult to alter animal protein intake and I focus on small incremental changes. It is imperative for the patient to choose for themselves, know benefits & risks associated with the behaviors, have a support system, and feel rewarded by their changes. I feel if they have a sense of ownership in their decisions, they will have a higher level of motivation and commitment. I like group educations because there is a power in 'mass' education and if you feel online education that is by a kidney MD that would support your messaging with your patients, please let me know: annamarierd@hotmail.com
- What forms of potassium are in Mexican food?
    - Oh goodness… where do I start? I will share a funny (true) story: When I began working in LA, many of my patients ate red beans and rice (beans: potassium, phosphorus). When we were moving to TX, I felt relieved to not think of beans and my dialysis patient any longer and my spouse asked me what I was thinking because everyone eats frijoles! There was no escape. I covered multiple clinics, some in the city, some rural, and most of my patients were Hispanic. For the most part the patients ate similar foods and yet, the patients in the city had higher phosphorus and potassium outcomes. The patients who lived in the rural areas had better support systems and their food was, for the most part, home cooked and fresh whereas the patients in the city were consuming more readily prepared foods and beverages containing additives. Mexican food is typically complimented with salsa, tomato, avocado, cheeses, and beans. One must consider the bioavailability of potassium in foods. We could do a class just on this!
- Can you suggest any recommended references to calculate/design plant-based CKD diet? So many of the recommendations are qualitative.
    - Plant-based diets are not routinely offered as a treatment option, and I believe this is the crux of the problem. Although a practical guide by Dr. Joshi provides some guidance it is not realistic to encompass large population groups of diversity and requires insight on both CKD treatment & plant-based nutrition further compounded by the variances that are exhibited by the disease itself,

nor does it take into consideration the underlying factors associated with the disease associated with social determinants of health. I personally appreciate the data by Goraya et al., with many research publications on all stages of CKD with use of F+V, and I do like this article Plant-Based Diets and Incident CKD and Kidney Function - PMC (nih.gov) , however, they do not illustrate the "How-To" that HCP need for hands on. Stay-tuned; this is a project I am working on. I do want to point out though: the Mediterranean and DASH diets are very easy to work with and are largely plant-based. Clegg et al. (2019) reviews evidence on growing evidence that both patterns and plant-based delay the disease progression. Another problem to highlight is there is no strict definition of what 'plant-based' means.

- What are some ways to improve eGFR in CKD Stage 3a?
    - I really love this question and I'm going to put myself out on a limb when I give my answer. Historically HCPs stated there is no way to improve eGFR (please recall we are considering chronic, not acute kidney injury) and I do not believe this. While I do not believe that the same process will hold true for 100% of persons affected with kidney disease, I do believe that there can be a halt to the progression, and perhaps some improvement. One must take into consideration underlying factors and the time of which the injury has occurred. Keep in mind: many people are unaware they have diminished kidney function for years before it is identified! Everything we discussed is the focus point: LPD of 50% or more plant based, low Na, and high fiber. Other items that need to be addressed: blood pressure, blood sugar, a healthy weight, activity level, no tobacco, and if NSAID/painkillers are used: review alternate pathways.
- Would the priority be focusing on adequate protein via animal and plant protein intake for a malnourished cancer patient vs. going low protein, plant based?
    - I am going to reiterate a previous answer for you that will be helpful: The LPD or VLPD should not be implemented in persons who are not metabolically stable. Often with a liberalized diet, patients still struggle to meet needs; the Mediterranean diet is a more liberal approach and if we really think about it, the PLADO diet is similar in nature to the DASH or Mediterranean diet. I might suggest a minimum of 1.0g.kg and this may vary dependent on the treatments the patient is going through. There are many factors affecting the actual intake and patients are typically struggling to meet their needs which is why I do like the Mediterranean diet (if the patient is not used to following a plant-based diet) and liberalized, with use of an ONS if needed. I err on the side of being realistic and helping the patient identify the foods they can best tolerate to maximize meeting their needs. Once the patient is stabilized, they slowly implement LPD. Here is a nice article that has helpful tips: Navigating a Chronic Kidney Disease Diet for Individuals With Cancer - Journal of Renal Nutrition (jrnjournal.org)
    - Although I personally follow a vegan diet, I do like the Mediterranean diet for persons who consume both plant/animals as it allows greater flexibility, is largely plant-based, and is useful for those who face hypercatabolic diseases at risk of cachexia. I liberalize with guidance and often use a plant based ONS to ensure they will achieve caloric needs.
- Does sprouting increase phosphorus absorption?
    - Yes!
- Can you clarify what is meant by "Mexican Food" where there are concerns of hyperkalemia? I live in Los Angeles and am a Mexican Dietitian. Not sure if you are referring to restaurant and fast food that is high in meat from Mexican restaurants or the plant-based foods that are common in the Mexican diet. Please clarify.
    - Please see the question above on what forms of potassium are in Mexican food.
    - It was interesting when the Noori study came out that said this and I chuckled because most of my career I've worked with Hispanic persons (San Antonio/TX region) and there are wide variances. The study: Noori N, Kalantar-Zadeh K, Kovesdy CP, et al. Dietary potassium intake

and mortality in long-term hemodialysis patients. *American Journal of Kidney Diseases*. 2010;56(2):338-347. doi:10.1053/j.ajkd.2010.03.022
    - In the Valley (TX) there is a greater (vast) amount & variety of fresh produce and yet I did not see this to be problematic. The problems I saw were associated with fast/commercially prepared food vs freshly prepared food regardless of whether it was meat or plant based. One of the problems I note is that when patients are initiating a plant-based diet, a dietitian will alert that their potassium is indeed getting higher and I reiterate that the swapping is a necessity: when adding beans/plants, the meat/animal sources must be decreased; it is a balance.
- What role would fats play in kidney disease?
    - Great question and I wish we had had more time to expand! Because of the high risks associated with comorbidities that persons with CKD face, a low-fat diet is beneficial, however a conundrum is that many patients with CKD are at risk for PEW and it may not be prudent to restrict their intake of fats. While dyslipidemia is common in CKD, it is not universal and may be impacted by the GFR, the etiology of kidney disease, use of immunosuppressants, and other comorbidities such as DM, etc. If there is the presence of dyslipidemia it is common for a statin to be prescribed, diet modification, and increased physical activity if possible. In stages 3-5 ~2 g/d n-3 PUFA can be prescribed, but caution with this for patients on hemodialysis or post-transplantation as there is a potential risk to the patency of the AV grafts, fistulas, or graft survival (transplant). More research is needed on this overall. Depressingly most focus is placed on the use of a statin vs the use of nutrition intervention; please see the KDIGO guidelines: KDIGO-2013-Lipids-Guideline-English.pdf . However, a sensible approach would be to adhere to the AHA guidelines as the current CKD guidelines are lacking and this is a very good article you will enjoy: Dietary Lipids and Dyslipidemia in Chronic Kidney Disease - PMC (nih.gov)
- When you mention pea protein is this only green peas, or are we talking about yellow, red, brown lentils, or chickpeas?
    - Pea protein used for ONS is extracted from both yellow and green split peas. There are different types of pea protein too: isolate (amino acids; only the pea protein), concentrate (contains additional CHO and protein) , or CHO and fats which may be used as a meal replacement), or textured (used for meat alternates).
- What is a good renal substitute for peanuts or peanut butter due to an allergy?
    - If your patient has a nut allergy, there are other protein sources to use such as tofu, legumes (chickpeas, lentils), seeds (flax, chia, sunflower) or even seitan (do not use seitan for those with gluten sensitivity though!).
- What are your thoughts on tofu? Is this a processed food to eat in moderation?
    - Although tofu is 'processed' from soybeans to soy milk, to curd and pressed into tofu, it is a minimal processing unlike processing that uses additional sugar, fats, salt, and typically does not contain additives. Thus, I equate the processing of tofu from the bean curd much as I would consider the processing of cheese from milk albeit a different process of course. Because tofu is minimally processed, contains all the essential amino acids, a good source of Fe and Ca I do encourage its use in a balanced intake. Admittedly, it took me years to grow a taste for it but once I dug in and learned how to cook it, I loved the versatility of it!
- Do you consider lentil pasta to be a portion of protein or a portion of grains? Or 50/50?
    - I go the 50/50 route so to speak, but ultimately, I am looking at the label: how much protein, how much CHO. It's a great source of fiber but does have a higher amount of protein so would not add additional protein sources to this. This works out good for patients who may have taste aversions or cannot stand the smell of meat cooking: the protein is in the pasta but in keeping with the daily needs.
- Advice or tips for those patients who very much dislike non-starchy vegetables?

    - Small, 'baby' steps. Identify what has been tried in the past and set a goal to trial 1 new one each week they have not tried and with some creative cooking tips with the possibility of retries on oldies but with different preparation. Sometimes it has to do with the texture; perhaps explore this? One of my kids (I have 7) is the same; but through a lot of trial and error there have been some that have been identified and some cooking methods that she absolutely loves.
- What about fish intake? What about vitamin B12 source?
    - The verdict in the 2020 guidelines is not in as far as 'plant or animal' but the verdict is in on red and processed meat (Avoid!). I defer to the Mediterranean diet here because to me the PLADO diet and Mediterranean can be interchangeable in many ways and we know that plant-based, DASH, and Mediterranean diets are kidney protective. Fatty fish such as salmon, tuna, and mackerel are a great source of omega-3s should patients choose to include fish.
    - If there is even a small source of animal products, then I do not promote a B12 supplement. If a patient is vegan then Vitamin B12 2/week, 1000mcg is sufficient. Now there are many foods (plant-based) that are fortified with B12, such as cereal, plant milk, plant butters, tofu, nutritional yeast.
- How about for Acute Kidney Injury patients getting dialysis? Are there any studies on plant-based diet with AKI population?
    - Admittedly, this is not my area of expertise and an RDN I know, Ann Cotton is my Go-To for all things AKI. However, with AKI it is a sudden kidney injury that's etiology driven, the protein needs can be quite high dependent on both the need for dialysis and additional critical illness (as high as 2.5g/kg) and I do not know of any literature that states plant or animal. The primary focus is avoiding hyperkalemia, metabolic acidosis, and edema. Nutritional markers that are often used to establish efficacy of nutrition intervention are influenced by both the patient volume status and inflammation. While this is an area of interest, there is more research that needs to be done on the inflammatory and antioxidant compounds from plants on treatment of AKI. Here is an article that approaches this discussion that I feel you might appreciate: A Review of Natural Products for Prevention of Acute Kidney Injury - PMC (nih.gov)
- In the hospital the renal diet restricts tomatoes, potatoes, and most salads, would you not necessarily recommend this then, but we should instead be providing smaller portion sizes?
    - Agree with you! Yes, and it is a wonderful way to collaborate with the community to provide education and illuminate exactly how much can be safely added. This is appealing to both teams and patients and promotes patient satisfaction. I used to work (back in LA) in both the in-patient and out-patient dialysis, and this offered me a great strategy to interface on how we could maximize patient meal satisfaction and ensure tray standards were maintained: it was an educational opportunity. Starting with a plant-based meal or an addition of an item is a great start!
- I am also curious about calcium supplementation - okay, or no?
    - It is generally not necessary. Patients with CKD are at risk of vascular calcification. I, personally, am biased against calcium supplementation and will only encourage a Ca supplement if a patient presents with hypocalcemia, <8.5 mg/dL and I would also assess the iPTH, Vitamin D, FGF23, and phosphorus level.
- How do you decide on protein recommendations for a malnourished patient who has pressure wounds, especially Stage 3 & 4?
    - This answer is similar in response to a previous question re: cancer: The LPD or VLPD should not be implemented in persons who are not metabolically stable. When I consulted in a wound care clinic this was a frequent conundrum. Even though we want to preserve the kidney function, the wounds do require additional protein for healing, and I use 1.2 – 1.5g/kg dependent on the stage of kidney disease, severity of PEW, and the pressure ulcer. This is where I feel ketoanalogues are under-utilized as the protein intake could be kept on the lower end with a

supplemented KA that would not build additional nitrogenous waste in the blood with provision of adequacy of kcals.

- What guidance can you give to protein intake for people who take protein supplements for body building in regard to protecting kidney function long term?
    - I highly recommend this under the direction and guidance of a dietitian who has a sports training background. I have several colleagues that focus on plant-based nutrition and are sports dietitians (collaborate). A plant source of protein supplement will be safer as it will not lend to as high of a net endogenous acid production though an excess protein load beyond what is needed for recovery following exercise can heavily burden the kidneys. The timing and dose of the protein supplements to workouts is extremely important; anything in excess is a burden and over the long term can cause harm. This is also an area where KAs can be beneficial in use as there would be less nitrogenous waste. Another point of interest: creatinine is a waste product of muscle metabolism; encourage hydration (water). As kidney function declines the thirst mechanisms may be altered and the body may not be able to eliminate excess fluid (Stage 4,5, 5-dialysis) thus this does need to be specifically tailored.
- How many servings of dairy/dairy alternatives do you recommend/day?
    - This is based on personal preference. Many veg sources are great sources of calcium such as tofu, leafy greens (kale!), broccoli, beans, nuts. If a patient does use dairy/dairy alternate, then the protein content is calculated towards the overall protein allowance.
- I would love to know how many different keto-analogue companies are in the U.S. now, practical application, forms (powder, pill, etc.) that you may be aware of?
    - Surprisingly not many! Ketorena used to offer both powder & pill though now only the pills are available. Here are two papers I wrote on KAs and please keep in mind that at the time of writing the powder was available. There is a chart that reviews the KAs, but the costs may be different at this time.
        - Rodriguez AM. Ketoanalogues: Not your everyday amino acids. *Journal of Renal Nutrition*. 2021;31(6). doi:10.1053/j.jrn.2021.08.003
        - Rodriguez AM. Ketoanalogue Review: New update on an old therapy. *Journal of Renal Nutrition*. 2021;31(6). doi:10.1053/j.jrn.2021.08.002
- Is there a source where vegetables are listed by P/K content? I am looking for a list of vegetables to recommend?
    - The NKF has wonderful education tools: Potassium in Your CKD Diet | National Kidney Foundation & Phosphorus and Your Diet - Levels, diet, deficiency | National Kidney Foundation
- How do you convince patients who are "meat and potato" eaters to include more fruits and veggies?
    - There was a question like this on the list and I must chuckle; I have a daughter who is in this category. It has been a journey, and I must remind myself that not everyone is on the same "food journey". Small steps/commitments with trials of a new veg or fruit. Review what was tried in the past and what was it they did not like about it? Perhaps a weekly trial of a new veg/fruit with a new prep method. I found that by mixing small bits slowly with the foods that she does love made it more acceptable and now she goes out of her way to seek them out. Also check in about textures – some people cannot stand the texture of cooked veg but are ok with fresh or vv.
- Are you aware of any meal services, like Hello Fresh or Purple Carrot that can be recommended?
    - Mealpro.net, MagicKitchen.com, Momsmeals.com (limited), marthasseniorgourmet.com (great for dialysis, but not countrywide); must be cautious to identify if the 'renal' diet is for CKD stages 3-4 or dialysis. If the patient is eligible for meals on wheels, I urge them to check if they will provide a kidney-friendly meal!
- Are there any unprocessed plant foods that CKD patients should be advised to avoid? (whole grain vs. white flour, etc.)

    - Whole grains are better; avoid processed or white flour. When I first started to work with kidney disease patients it was the opposite! We now know better.
- Is it important to keep organic produce? Do the pesticides make it harder on the kidneys?
    - I feel certain that a host of environmental toxins are associated with numerous chronic diseases. While most of the patients I work with cannot afford organic produce I do encourage to wash/clean produce prior to eating and to purchase from local farmers markets when possible. It is usually less expensive this way as well. Here is an article I feel you will appreciate on this topic: Association of Pesticides and Kidney Function among Adults in the US Population 2001–2010 - PMC (nih.gov)
- What are the bone turnover markers that you referred to in one of your slides?
    - Storz & Ronco data reviewed calcium & vitamin D (slide 24). The Finnish balance study (slide 34) also calcium & vitamin D.
- Is there a difference in micronutrient profiles (except for sodium, obviously) for canned beans vs dried (boiled and then drained)?
    - This will vary dependent on the amount of time of soaking/cooking. But here is an example on black beans from the USRDA database (100g) with variances:
    - Canned: 384mg Na, 108mg P, 308mg K+
    - Cooked/boiled w/o salt: 1mg Na, 140mg P, 355mg K+
- What is the impact of a patient/client having only one kidney on their NEAP levels? What diet adjustments are made in this instance?
    - People can thrive with a single kidney without any problems at all, no diet adjustments. I encourage to be proactive: control HTN or BS if applicable, keep a healthy weight, regular exercise, no smoking, and avoid NSAIDS/pain medications at all costs – that was the underlying trigger to the damage to my kidneys. Using a plant-based approach or the DASH or Mediterranean diet is kidney protective.
- For potassium do you use 39mg/kg/BW as a guide? For phosphorous do you use 16mg/kg/BW as a guide?
    - No, I do not use these calculations. When I first started working with kidney disease the "renal diet" was overly restrictive and incredibly difficult for patients to adhere to. The guidelines for potassium state to 'adjust dietary potassium intake to maintain serum potassium within the normal serum range'. We must consider that the higher the fiber content of the plant food the less that will be absorbed as the fiber facilitates potassium excretion in the stool. Additionally, the use of K+ binders such as Veltassa, Lokelma, or Kionex. In regards to phosphorus, using an LPD will reduce phosphorus naturally and additionally only ~50%, or less, of the phosphorus from plants is absorbed. The culprit with phosphorus is the additives: education is necessary to avoid processed foods containing phosphorus.
- Are you saying the general public should minimize protein to protect their kidneys? Does this apply to kids?
    - Children have specific needs for growth and should not be minimized. Several precautions can be taken by the public though and this would apply throughout any age span. The Western diet typically is high in protein, fat, sugar, salt, while low in fiber; and what makes it more problematic is the portion sizes. We, Americans in general, are eating much more than what is needed, and this is mirrored by the sharp growth of all chronic diseases. To maintain a healthy lifestyle that is kidney and cardio protective we can reduce our intake of fat, sugar, and salt, and increase fiber. Substituting a few plant-based meals per week, maybe 1-2 dinners, a lunch, and a breakfast to start will reduce animal protein causing a favorable shift away from an acidic environment, increase fiber, antioxidants, and phytochemicals and favorably shift gut bacteria from a proteolytic to a saccharolytic profile reducing key uremic toxins that are associated with both CKD & CVD.

- Regarding lowering PRAL - what cheeses or plant-based milk drink can you suggest?
    - It truly comes down to personal preference. Many plant-based milks are fortified with calcium, vitamin D, vitamin B12, and Omega-3 FAs; while I make my own plant-based milk, I do purchase a back up of either soy or oat depending on the plans for the use! Occasionally I'll use almond milk, but to me it is rather bland so it will really come down to personal preferences. Having been raised in WI and eating cheese all my life, it was a challenge to find a cheese alternative for occasional use. What I stress when I am reviewing this with patients is this will be a processed food and to look at the ingredients. The things I look for: Saturated fat (tropical oils too), sodium. I personally like the Follow Your Heart and the Field Roast Chao brands. The Herbivorous Butcher makes their own plant-based cheeses, and they ship throughout the country; they have a great variety but caution with the saturated fat there - with the exception of their Bleu Cheese, Ricotta, and Feta.
- What amount of protein would you recommend for cancer patients who are undergoing treatment and also have CKD stage 3-5 (not on dialysis)? Protein needs are higher in this population, so I always find it conflicting.
    - We've had this question a couple times and I feel bad that there are so many patients with so many comorbids but thankful that they have us to care for them! In this patient population they are not 'stable' thus we would not implement an LPD or VLPD until they were stabilized. Please see above.
- So, if fiber intake benefits are from natural sources, can we use supplement fiber with alkaline water to have similar benefit?
    - You will like this article which includes a nice overview of food sources of fiber that I find convenient. Any fiber is beneficial, though when we substitute the naturally occurring sources, we reduce the intake of phytochemicals & antioxidants which are the powerhouse feature that fights inflammation; it is both cardio & kidney protective. Alkaline water may have added sodium, calcium, potassium, magnesium and is best to use this approach with monitoring lab outcomes. The Benefits of Fiber in Chronic Kidney Disease - Journal of Renal Nutrition (jrnjournal.org)
- Which labs do you monitor w/CKD please?
    - eGFR, blood tests to measure waste such as creatinine and BUN, urine test to identify the presence of proteinuria; these will give a quick snapshot to staging kidney disease using the heatmap: heat_map_card.pdf (kidney.org)
    - When I order my labs, I order a kidney profile plus metabolic panel; can add an iPTH, Vitamin D, 25-hydroxy, and a urinalysis, complete with microscopic examination. A nephrologist will determine specific labs that are necessary for your patient, but these are the labs that I would review. I order my own on a consistent basis to closely track; I do not think many people are aware they can do this!
- Do you recommend Renadyl as a Probiotic?
    - I prefer the route of natural foods (personally) can be sufficient in promoting a healthy gut but am cognizant that not all patients might tolerate or adhere to the nutrition interventions meant to optimize their health so do feel strongly that there is a place for everything! I think it is very exciting how our gut health uniquely impacts our overall health and well-being and I feel we are still in the learning stages of this. Here is an article I feel you'll find fascinating: Prebiotics and probiotics: are they functional foods?123 - The American Journal of Clinical Nutrition
- After your slide on acid in eggs, I am wondering if 4-5 eggs (but only one yolk daily) is too many? I have a client that has an allergy to all legume/pulses except for lentils so eggs are a staple.
    - The protein restriction is related to the BW but if the g of protein from the 4-5 eggs is within the range and keeping in mind the overall protein intake of the day, then that should be fine. The yolk is the culprit thus it seems your patient has already minimized this risk and is using just

enough for ‘flavor’. This is an example of where we are minimizing the risks by following an LPD and taking additional precautions while still providing the patient autonomy with a realistic approach. Another item to trial might be whole grains that have good sources of protein such as quinoa, wild rice, or couscous.

- Are ketoanalogues available over the counter?
    - They are available online! Just a very few sources. I am going to share from a previous question: Ketorena used to offer both powder & pill though now only the pills are available. Here are two papers I wrote on KAs and please keep in mind that at the time of writing the powder was available. There is a chart that reviews the KAs, but the costs may be different at this time.
        - Rodriguez AM. Ketoanalogues: Not your everyday amino acids. *Journal of Renal Nutrition*. 2021;31(6). doi:10.1053/j.jrn.2021.08.003
        - Rodriguez AM. Ketoanalogue Review: New update on an old therapy. *Journal of Renal Nutrition*. 2021;31(6). doi:10.1053/j.jrn.2021.08.002
- What are your thoughts on high protein supplements' effect on kidney function in a healthy adult?
    - I had shared similar feedback on a question close to this; please scroll up!
- So would there be any benefit and/or detriment to keto analogues for patients on dialysis? Especially for the ones that struggle with protein intake?
    - I have done this and yes. This was ‘back in the day’ when they were only available by Rx and through one company. I will not share how my patient obtained them; it was horrible, and I am very glad that they are now readily available albeit at a price. If a patient has a medical flex card this might be very helpful. Also: for a patient who has significantly high protein needs but is very uremic and are struggling with ultrafiltration due to a poor access: have used in that type of scenario as well. Zhang et al. (2014) used KA with VLPD in patients who were on twice weekly dialysis to preserve residual renal function, thus this is also a very good use.
- Can you comment on patients with kidney disease as a result of hypotension and if your dietary recommendations might differ for these patients than it does from other etiologies of CKD?
    - I encourage to review with the MD primarily due to the underlying issue of cardiac function. This takes a team effort with probability of cardiac med review, and review of volume status with possible diuretics, and monitoring K+. Lastly monitor B Vitamins. Persons with kidney disease are prone to anemia as the kidneys regulate RBC production. Check B12 & folate specifically. In the presence of microcytic anemia check Fe levels: review for %sat & ferritin though ferritin can be impacted by inflammation. Here is an article which you might find insightful: Hypotension and Renal Dysfunction: The Ghosts of Heart Failure - PMC (nih.gov)
    - The diet I would encourage would be the PLADO approach with reviewing the above mentioned items.

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