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Eating Mistakes That Can Damage Your Kidneys

Analysis by Dr. Joseph Mercola | November 19, 2023

STORY AT-A-GLANCE

- Your kidneys lower your body acid burden. As kidney failure progresses, acid tends to accumulate in your system, causing severe harm
- A high-acid diet can deteriorate your kidney function and accelerate the progression of kidney disease
- Any diet high in fruits and vegetables and low or devoid of processed foods and dairy products will be lower in acid
- Anything that helps improve diabetes will also improve kidney health. This includes fasting or time-restricted eating and exercise
- High-protein diets can also damage your kidneys, thanks to the ammonia generated. To protect your renal health when eating a high-protein diet, add in more fruits and vegetables to buffer the acid created

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In this interview, Dr. Lynda Frassetto, a nephrologist and Professor Emeritus in the department of medicine at University of California San Francisco (UCSF), shares important information about how acid in your diet affects your kidney health and longevity.

> *"When I was in internal medicine training, I happened to have a really super mentor, Dr. Eli Friedman, at the State University of New York (SUNY) in Brooklyn,"*

Frassetto says. *"He made nephrology sound really interesting.*

And so, after I finished my residency and was a hospitalist for a couple of years, I decided to go back and do nephrology, because people who did nephrology just have a better understanding of physiology than most internists do.

I thought that would help make me a better doctor. After I finished my fellowship, I started working with Anthony Sebastian here at UCSF. He was interested in diet acid load in people who were relatively healthy.

The kidneys do a lot of things. One of the things they do is they get rid of acid. We know that as kidney failure progresses, you have trouble getting rid of the acid. It accumulates in your system and has a lot of bad side effects.

We also know that, as you get older, your kidneys tend not to work as well. What Tony was looking at was, in otherwise healthy, older people — whose kidneys just aren't working as well as they did, let's say, 40 or 50 years earlier — does eating a high-acid diet have any potential side effects?"

Low-Acid Diets as a Means to Protect Kidney Function

In the initial stages of their work, Frassetto and Sebastian worked on neutralizing acid in the diet using bicarbonate. Then, just over a decade ago, they started looking at low-acid diets. While all foods contain precursors that can be metabolized into acids, fruits and vegetables contain a lot of alkali precursors that are metabolized into bicarbonate, like citrate or malate.

Frassetto's interest in low-acid diets began with the paleo diet, promoted by Loren Cordain, Ph.D. According to Cordain, many foods in our modern diet were unavailable to our ancestors, such as processed grains and sugars.

He believed a diet closer to our ancestral diet would be healthier, and one of the reasons for this is because any diet high in fruits and vegetables (and devoid of processed food) will be lower in acid. As explained by Frassetto:

"If you look at any large population, and you just look at the average kidney function over time, on average, everybody's kidney function declines. But if you look at specific individuals, kidney function either declines much more slowly or may even level out.

The question is, 'How related is that to eating a low-acid diet or doing things that wouldn't bother your kidneys?' This has actually been looked at by Dr. Donald Wesson, a nephrologist at University of Texas (UT) Southwestern.

He's looked at both alkalized supplements and fruits and vegetable diets in people with Stage 2 kidney disease, with an estimated glomerular filtration rate (GFR) between 60 and 90, and Stage 3 chronic kidney disease (CKD), which has an estimated GFR from 30 to 60.

[GFR is] an estimate of kidney function. So, if you're 50 years old, your GFR is about 90. If you're 80 years old, your GFR is about 60. On average, people who are older are going to have … Stage 2 or Stage 3 CKD.

Wesson showed that in these people, if you either give them alkalized supplements like baking soda, or put them on a diet with more fruits and vegetables, that you could slow the rate of decline ...

If you extrapolate that from people with kidney failure to just older people, the idea would be that, maybe, you can slow the rate of decline of your kidney function, even if you're otherwise healthy and just getting older. That's the idea.

Everything that you do, everything, is related to kidney function in some degree. Because the kidneys get rid of a lot of things. The worse the kidneys work, the worse everything works."

Fasting Also Protects Kidney Function

According to Frassetto, most kidney disease in western countries is more advanced kidney disease caused by high blood pressure and Type 2 diabetes. Three-quarters of

patients on dialysis are there due to high blood pressure and diabetes. So, ultimately, anything that helps improve diabetes and high blood pressure will also improve kidney health.

One strategy known to significantly lower your risk of Type 2 diabetes is fasting, including time-restricted eating. I've previously interviewed Dr. Jason Fung, a nephrologist in Canada, who uses fasting to reverse diabetes in his patients. Exercise is yet another strategy that will lower your risk of diabetes, and thus protect your kidney health.

Acid Versus Protein Damage

Acid isn't the only thing that can damage your kidneys. High-protein diets can also cause harm, thanks to the ammonia generated. As for which may ultimately be worse for you — high acid or high protein — Frassetto explains:

> *"All proteins contain acid precursors. If you're eating a high protein load and you don't have enough alkali to help the kidneys either buffer or get rid of the acid, then that's ultimately bad for your kidneys. But you do need to eat a certain amount of protein, or you're going to have problems building things too.*
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> *This is really a balance question. It's not that protein is bad. It's that, if you're eating a lot of protein, you should also be eating a lot of alkali. That will help you not use the body systems to neutralize or buffer the acid in your system. The whole idea is that you want to maintain your blood pH within the range considered to be normal.*
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> *To do that, you either move the acid inside the cells, you break down the muscles to supply glutamine, ultimately to the kidneys, to excrete the acid as ammonium. You also break down your bone, which is calcium hydroxyapatite, which is the alkali.*
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> *Or, you have to decrease the amount of endogenous acids that you produce in order to be able to maintain your blood pH. Your body has a lot of ways of*

dealing with the acids that the kidney has to get rid of.

So, if you're giving the body exogenous alkali, meaning you either take bicarbonate or you eat a lot of fruits and vegetables, you don't need to break down your bones and muscles in order to be able to neutralize the acid in your system …

Hydrogen ions are balanced at the level of 10-9, which is a super-low level of free hydrogen ions in the body. And the changes that you can make to that without going outside the range of normal and becoming ill is not very big.

There are only a couple of things you can do here. Either you're going to break down your body systems or you [need to] give your body exogenous alkali."

Patients with advanced kidney disease will typically get exogenous alkali — usually a combination of sodium bicarbonate and sodium citrate — as it's been shown to slow the advancement of the disease and delay the need for dialysis. The sodium citrate will also lower your risk of kidney stones.

Potassium bicarbonate should not be used when you have kidney disease. The reason for this is because, when you have kidney failure, potassium can accumulate to lethal levels. Controlling blood pressure and diabetes are also important when you have kidney disease, as is controlling proteinuria (damage to the glomerular barrier).

How Klotho Benefits Kidney Function

The protein klotho is helpful for ridding your body of phosphate, and phosphate is another acid that has to be excreted by your kidneys. Interestingly, transgenic animals that have been genetically edited to overexpress the klotho gene also live 10% to 40% longer.

Klotho is a membrane transporter and a soluble protein. When you eat a high-phosphate diet, you release fibroblast growth factor 23 (FGF23), which attaches to klotho as a

cofactor and then goes to the kidneys, where it removes the transporters that allow your kidneys to reabsorb phosphate. This helps maintain a normal phosphate balance.

However, with age and declining kidney function, you need more and more FGF23 to get rid of the phosphate. FGF23 also prevents the actions of 1-alpha hydroxylase, an enzyme necessary for the activation of vitamin D, and vitamin D is necessary for the production of klotho.

So, as you get older and continue eating a high-phosphate diet (which is easy since phosphate is in most foods), your FGF23 goes up while your vitamin D and klotho levels go down. As a result, your kidneys start reabsorbing more phosphate, thus incurring more and more damage.

The answer, then, is not only a low-acid diet. You also want your diet to be relatively low in phosphate. What is a high-phosphate diet? Frassetto explains:

> *"First off, dairy products. All dairy products contain essentially four things: calcium, phosphorus, protein and fat … So, for kidney failure patients, we pretty much eliminate dairy products.*
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> *And then colas. They add phosphatidic acid to a lot of things, including soda. We try to get people not to drink stuff that has phosphatidic acid in it. And then there are some other specific foods, like chocolate and nuts that we tell people with advanced kidney failure to avoid ... Beans are another high source of phosphate."*

Assessing Your Kidney Function

To get an idea of how well your kidneys are functioning, you'd typically start with a renal panel. This will give you your blood urea nitrogen level and serum creatinine. Your GFR is then calculated based on your gender, age, race and serum creatinine level. Based on the results of your renal panel, other tests may be prudent.

"In terms of just looking at kidney health, there are two things that we look at," Frassetto says. *"One is [the estimated] GFR number. Two is, 'Do you have any protein in the urine?' Those can be two separate problems. Protein in the urine, in and of itself, is bad for kidney function …*

This was discovered many years ago by Dr. Barry Brenner. He did five/sixth nephrectomies in rats (so only a small part of one kidney remained) and showed that the remaining kidney, the so-called nephron remnant, had to hyperfilter to be able to clear all the blood. That hyperfiltration through the glomerular membrane was bad for the membrane, so the membrane started to leak protein, and the kidneys failed faster.

So, we now know that there are a number of kidney problems where the membrane is leaking protein. That causes the kidney to be more damaged.

If you had to do just two things just to see how healthy you are, the first would be to get a blood test to see where your kidney function is. The second is to get a urinalysis. Pretty much any time you go in for a primary care visit, those are the two tests that they usually do."

Acidotic Stress

While most people are familiar with oxidative stress, acidotic stress is another type of stress that can take a significant toll on your health. Frassetto believes both are equally important, especially where kidney disease is concerned. Acidotic stress also plays a role in aging.

"A friend of mine named Dr. Elissa Epel has looked at the relationship between telomere length, telomerase activity and oxidative stress. [She] has shown people who are under a lot of psychological stress have shorter telomeres and abnormal telomerase function.

They have higher levels of oxidative stress. I happen to have done more research on [acidotic stress], but really, I think it's a combination of both,"

> Frassetto says. *"So, the whole idea would be to lower the amount of oxidative stress and lower the amount of acidotic stress, and therefore limit the damage to the body."*

More Information

To summarize, a low-acid diet is basically a diet high in fruits and vegetables, with a moderate amount of protein. Again, the more protein you eat, the more fruits and vegetables you need to maintain a healthy balance. A low-acid diet is also low in or devoid of dairy products.

Keep in mind that by the time most people are sent to a nephrologist, they've already lost three-quarters of their kidney function. So, to make a difference, you really want to start thinking about your kidney function early on. Get regular blood tests of your BUN and creatinine, and a urinalysis, and if they start revealing a problem, address it as soon as possible.

While the kidney transplant process has improved a great deal in recent years, the number of available donors is limited, so the number of patients on dialysis has steadily risen.

As noted by Frassetto, dialysis is extremely expensive, and just barely keeps you alive. Moreover, while end-stage renal disease is covered by Medicare in the U.S., it only really covers dialysis. It does not cover all needed medications, for example.

The take-home message is that you cannot count on sophisticated end-stage therapies. The answer is preventing the problem in the first place. The role of dietary acid is a fairly recent discovery that is not widely known, but that can make a big difference in your renal health.

Avoiding high-phosphate foods could go a long way toward improving and maintaining your kidney function as you get older. **Cronometer**, a free online nutrition tracker, is an easy way to track the amount of phosphorous is in your diet. The National Kidney Foundation's website[1] is another helpful resource.

Sources and References

- [1] National Kidney Foundation