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Traditional and nontraditional risks for kidney disease: a comparison of Western and Paleolithic-type diets

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Kidney function generally decreases as people age, so that from young adulthood to old age, perhaps half of the original kidney function is lost. There is some argument about whether decreasing renal function with age is "normal" or pathologic. In the Baltimore Longitudinal Study on Aging, a cohort of men followed for several decades, about one third of subjects did not have a decline in renal function.[1]

Thus, although "age" is not a specific determinant of renal function, diet can contribute to common kidney diseases in many ways. In westernized countries, the most common reasons for having advanced chronic kidney disease or needing dialysis are the traditional risk factors, diabetes and hypertension.[2]

Typical American diets are often high in calories, sugar and salt, which can promote obesity, diabetes, and high blood pressure. All of these factors promote decline in renal function, as well as damage to other organ systems, such as the heart, brain and peripheral blood vessels. For these people, the underlying pathology is damage to the blood vessels, leading to progressive ischemic kidney disease.[3] Being on dialysis does not stop the underlying damage to the rest of the body, so that death from cardiovascular disease within a few years of starting dialysis is common.[4, 5]

Paleolithic-type foods will vary depending on the ecology of the biosystem, but typically were mostly composed of meat or fish, fruits, vegetables, roots, insects and nuts. The salt content of natural foods is extremely low.[6] Intake of whole fruit, which contains fructose as well as fiber, has been shown not to increase fructosamine or glucose levels, suggesting that the effects of carbohydrates in the body depends on the source of the carbohydrate.[7] Studies using Paleolithic type diets have reported decreases in weight, fasting blood glucose and blood pressure.[8, 9]

Western diets also contain a number of non-traditional risk factors for renal disease. These are classified as uremic toxins, substances that accumulate in renal failure and whose accumulation also results in further renal failure. These include high phosphate intake – often in the form of sodas, dairy products and legumes, high diet acid content – due to low fruits and vegetable intake, and high uric acid intake – mainly due to high fructose corn syrup.[10]

High uric acid intake and high phosphate intake can lead to an increased incidence of renal stones.[8] Fruits and vegetables contain bicarbonate precursors, in the form of organic anions like citrate and malate, which buffer the acid load coming from the rest of the diet.[11] Recent data suggests that buffering the tissue acid loads slow progression of kidney disease.[12] Phosphate is mainly regulated by FGF23 and klotho is a co-factor for FGF23. The higher the diet phosphate intake, the greater the amount of FGF23 produced, which leads to lower klotho levels.[11] Klotho has been identified as an

antiaging factor.[12] So, higher phosphate intake may potentially lead not just to progression of renal disease but also to faster aging due to higher FGF-23 and lower klotho levels.[13, 14]

Paleo-type diets, in comparison, which generally have high plant food contents, are usually higher in potassium and lower in sodium than even “healthy” diets, such as the Mediterranean or DASH-like diets.[15] Diets high in plant foods and low in salt would also be low acid diets.[16] Eliminating high fructose corn syrup, would not only lower sugar intake, but lower uric acid production. And, although all foods contain phosphates, eliminating foods with high or added phosphates such as dairy products, legumes and sodas, will limit dietary phosphate intake.[6]

In summary, Paleo-type diets by limiting salt and sugar should not only help limit damage to the blood vessels in the kidneys and other organ systems, and by lowering intake of dietary uremic toxins should help decrease kidney stone production, lower diet acid loads and potentially lower FGF23 and higher klotho levels. All of these effects together should lead to improvements in function of the kidneys as well as the rest of the body.

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