Is Medical Nutrition Therapy Appropriate for Kidney Stones?

STONES THAT FORM IN THE kidneys (nephrolithiasis) or in the urinary tract (urolithiasis) have been increasing in prevalence.[1-6] Kidney stones can vary in their size, shape, location, and type, (ie, calcium, uric acid, struvite, and cystine).[7] Most calcium stones are comprised of either oxalate or phosphate, with calcium oxalate stones being the most common.[1-4,7,8] Knowing the type of kidney stone is essential in terms of its treatment and prevention,[1-2] especially considering the high recurrence rate.[1,2,6,8]

The medical management of kidney stones involves a metabolic evaluation, including a 24-hour urine collection and serum assessment of creatinine, electrolytes, parathyroid hormone, vitamin D, and/or uric acid levels.[1,2,4,6] Once the source of the stone is detected, dietary modifications may be warranted, but there is not always a "nutritional cause" for high levels of calcium (hypercalciuria), oxalate (hyperoxaluria), uric acid (hyperuricosuria), or low amounts of citrate (hypocitraturia) in the urine. As with any other medical diagnosis, the nutrition therapy provided by the registered dietitian nutritionist (RDN) should be individualized based on the patient's current health status and known risk factors.[1,2,8]

Reviewing the patient's diet history will help to determine whether there is an excess or deficiency in any of the nutritional factors that can influence the urinary profile. For example, hypercalciuria can result from an excess of salt,[1-4,6,8] refined carbohydrates,[1,2,4] or from a diet high in protein from animal sources[1-4,8] or low in fiber,[1] which is typical of Western diets. Hyperoxaluria can be a consequence of diets that are high in oxalates or low in calcium, magnesium, fiber, and fruits/vegetables.[1-3] In the case of hypocitraturia, a high salt intake[1,3,6,8] or a diet including foods with a high acid load potential[1-4,6] or one that lacks potassium,[1,4,8] magnesium,[1,6] or fruits and vegetables[1,4,8] has been shown to be of concern.

In the past, a low-calcium and low-oxalate diet was advised for the treatment of calcium oxalate stones. While that approach may still be required in some cases, more recent research has suggested that only a small amount of oxalate is actually derived from the diet, partly due to its irregular rate of absorption, bioavailability, and inverse relationship with calcium.[1-4,8]

A higher incidence of kidney stones has been detected in people whose diets are deficient in calcium,[1,3-6,8] so achieving the recommended dietary allowance (RDA) for calcium is the current guideline.[1-3,6,8] Because of calcium's ability to bind with oxalate in the gastrointestinal tract, consuming calcium from dairy sources or supplements with a meal is considered advantageous.[1,2,7,8]

Balancing the renal acid load can be achieved by including more fruits, vegetables, and fiber, since they also supply magnesium and potassium, two micronutrients that have been associated with a lower incidence of kidney stones.[1-4,6,8] Limiting sodium is another important consideration, as it competes with calcium for absorption,[1,4] and decreasing sources of purine from "flesh foods" (ie, animal proteins) can help in the treatment of uric acid stones.[1,2,7,8]

Regardless of the stone type, there is usually a need to increase fluid intake in order to achieve a urinary output goal of 2 liters per day for adolescents and adults.[1-4,6,8] There is lack of agreement regarding which fluids to encourage,[2-4,7,8] and many barriers to increasing fluid intake exist and need to be taken into consideration when counseling clients who have developed kidney stones.[1] Some beverages act as mild diuretics, such as coffee and tea, and may help increase urinary output[4]; whereas other sources that include citrate (ie, citrus fruits) have been shown to increase urinary pH and help prevent stone formation in some cases.[1,3,4,6,8]

The assessment of these "nutritional risk factors" will allow RDNs to provide customized medical nutrition therapy for the treatment of kidney stones and help to minimize their recurrence.

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