Serum Vitamin D Status, Vitamin D3 Supplementation and Urine Calcium Levels Among 140 Calcium Kidney Stone Patients

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Introduction

Although there are current guidelines for the metabolic evaluation of patients with nephrolithiasis, there is no guideline for the management of coexisting vitamin D deficiency among these patients. The available research is not clear regarding the role of vitamin D in either causation or, or protection from, kidney stone formation. It is known that vitamin D has an essential role in calcium metabolism, and that vitamin D deficiency is common in the population. The purpose of this research is to help clarify the association, if any, between vitamin D status and urine calcium levels among patients with calcium kidney stones.

Methods

This study detected and treated vitamin D insufficiency in calcium kidney stone patients with concurrent metabolic urinary studies before and after vitamin D supplementation. Between 2015 and 2017, 140 patients were evaluated in a community based urology practice following management of an acute episode of nephrolithiasis. Only patients with calcium composition stones were included. Initial metabolic evaluation measured stone composition, serum chemistry, 24 hour urine chemistry and baseline serum 25-hydroxy vitamin D (25-OHD). Patients who were found to be “not sufficient” for 25-OHD (<30 ng/ml) were advised to take 10,000 IU of over-the-counter vitamin D3 per day for two months, and then to return for retesting of 25-OHD and 24 hour urine calcium.

Results

Almost three-quarters of the 140 patients initially were not sufficient in 25-OHD (N=101 or 72%). No statistically significant association (at the 0.05 level) was found between 25-OHD status and urine calcium level. Two-thirds of the 101 insufficient patients had a follow-up 25-OHD test after two months of advised vitamin D3 intake (N=65 or 64%). Of these, most became sufficient (N=58 or 89%), and none exceeded the sufficient range of 30-100 ng/ml. Two-fifths of the 101 patients had both follow-up tests: 25-OHD and 24 urine calcium (N=40 or 40%). There was no statistically significant change (at the 0.05 level) over time (from pre-D3 supplement to post supplement) in the initial lack of association between 25-OHD status and urine calcium levels.

Conclusions

Correction of vitamin D insufficiency with over-the-counter vitamin D3 in calcium kidney stone patients was promptly effective, and did not significantly affect urine calcium level. In other words, the observed positive change in 25-OHD status did not significantly improve, or harm urine calcium levels.