

Arguments for a comprehensive metabolic evaluation of the first-time stone former

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There are 2 ways to perform a metabolic evaluation of a stone former: limited evaluation or comprehensive evaluation. Components of the limited evaluation include serum electrolytes, creatinine, calcium, uric acid, phosphorus, stone analysis and urinalysis, including urine pH. The most important outcome of the limited evaluation is to diagnose uncommon, but potentially serious, systemic conditions, such as primary hyperparathyroidism or distal renal tubular acidosis. In contrast, a comprehensive evaluation goes beyond the limited evaluation with ideally 2 24-hour urine collections^{1,2} on a random diet with minimum components of urine volume, creatinine, calcium, sodium, citrate, oxalate and uric acid. Traditionally, we have avoided any metabolic evaluation in first-time stone formers; few practitioners pursue a limited evaluation and even fewer proceed to a comprehensive evaluation. The avoidance of more detailed evaluation upfront flies in the face of studies demonstrating a substantial prevalence of metabolic abnormalities in both first-time and recurrent stone formers, for which we have effective treatment options that substantially reduce the risk of stone recurrence.^{1,3,4}

Stone patients face a substantial risk of recurrence after a single episode; the risk of approaching 50% at the 5-year mark.⁵ Even patients with asymptomatic lower pole calculi during short-term observation have a substantial risk of requiring surgical therapy.⁶ The highest incidence of stone disease (ages 20 to 60) occurs during a time when personal and work obligations compound the impact of even a single stone recurrence. Economic analyses demonstrate increasing overall costs for the treatment of nephrolithiasis in North America, with the overwhelming majority of costs due to surgical interventions.^{5,7} In addition, we live in a time of unparalleled worldwide adoption of a potentially lithogenic western diet (high in salt and animal protein and deficient in adequate calcium consumption) that makes prevention even more important, as we think beyond the care of the patient and reflect on our public health role. Within the context of the Canadian health-care system, the costs of both a limited and a comprehensive metabolic evaluation are miniscule compared to the cost of a

single hospital admission for common surgical options for nephrolithiasis.

Many studies have demonstrated the substantial impact of enrolling stone patients in dedicated stone prevention programs, which can reduce the risk of a stone recurrence, with the potential for substantial health-care savings.⁸⁻¹¹ Stone clinic programs are marked by patient investigation with a comprehensive evaluation in which all patients receive dietary advice and select patients are placed on medications (with their associated costs). Our literature is deficient in randomized trials comparing dietary advice alone with the alternative of stone counselling/treatment after a comprehensive evaluation with a primary endpoint of stone recurrence rates. In our pursuit of reduced recurrence rates in our stone patients, we can only copy from the gold standard results achieved at dedicated stone centres.

Urologists may erroneously assume that pursuing a metabolic evaluation and complying with preventive strategies require a substantial burden of "harm" from emergency visits or surgical interventions to prime the patient to follow our advice. A recent study from the University of Texas Southwestern group demonstrates this discrepancy. This study showed that most patients, even those with limited prior stone events, wished they had been given the option of more aggressive medical intervention to prevent stones.¹² Empiric dietary advice, without a link to a laboratory evaluation (i.e., a 24-hour urine collection readout), may not be transferring the knowledge patients need to feel empowered to manage their own health.

Detractors will cite reports of detailed economic analyses that suggest empiric treatment without a metabolic evaluation is more cost-effective than directed therapy after a metabolic evaluation.^{7,13} Unfortunately, when empiric therapy proceeds beyond dietary advice and involves the non-selective addition of medications, it is likely that few patients would agree to lifelong therapy without the clinician clearly demonstrating a defined laboratory abnormality. In addition, if population dietary trends are placing patients at higher risk of recurrence and surgical intervention, the cost of a metabolic evaluation becomes easier to justify.

Additional arguments against directed therapy after a metabolic evaluation cite the beneficial results of the non-

selective use of drugs, such as potassium citrate,¹⁴ to reduce stone recurrence and to avoid the initial laboratory costs of the evaluation. It is unclear whether the increased use of potassium citrate is responsible for the increased percentage of calcium phosphate stones in stone analysis laboratories.^{15,16} Regardless, an increased prevalence of brushite calculi is not a good trend.

Additional ammunition used by opponents of more liberal comprehensive evaluation guidelines cite the stone clinic effect:⁸ a substantial reduction in stone events follows an increase fluid intake, a reduction in salt and animal protein and a consumption of adequate amounts of high calcium foods/fluids. Indeed, the patient undergoing a comprehensive evaluation is unlikely to go on lifelong drug therapy after a single stone event. However, the documentation of high urine sodium or urine uric acid helps reinforce the persistent need to have patients evaluate their food choices, specifically their salt and animal protein consumption. We all have the experience of patients voicing surprise at the finding of substantially elevated urine sodium when they assumed they were following a low-salt diet. Indeed, Parks and Coe demonstrated the tenacity of our salt gluttony with a counterproductive minimal increase (not decrease) in urinary sodium over time in their male stone clinic patients.¹¹ Excessive sodium intake is increasingly a public health issue,^{17,18} and we have the potential to make a substantial impact in the overall care of our stone patients.

The last decade has seen a remarkable evolution in the teaching of metabolic stone management in our urology training programs and organizations. Urologists are increasingly comfortable performing both the metabolic evaluation of the kidney stone patient and administering common stone-preventing medications, such as diuretics and alkali agents. We have the potential to positively affect individual and public health through expanded nephrolithiasis metabolic investigation and treatment.

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