



Twenty-four-hour urine osmolality should be used in combination with other urine parameters in urolithiasis patients

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Editor,

We read with great interest “Twenty-four-hour urine osmolality as a representative index of adequate hydration and a predictor of recurrence in patients with urolithiasis” by Kang et al. [1]. In this retrospective cohort of 680 patients with renal or ureteric stones, Kaplan–Meier survival analysis indicated that the low urine concentration group had a significantly longer stone recurrence-free period than the high urine concentration group, and Cox regression analyses identified 24-h urine osmolality (UOsm) as an independent risk factor for stone recurrence. The authors suggested 24-h UOsm as a promising approach to assessing hydration and predicting stone recurrence in urolithiasis patients.

In this research, the authors used a threshold of 564 mOsm/kg to define high- and low UOsm groups. By contrast, a previous study suggested that a 24-h UOsm less than 500 mOsm/kg might be an indicator of optimal hydration [2]. In fact, given the complicated etiologies of kidney stones, hydration therapy needs to be individualized. A recent research of 257 pediatric kidney stone patients and 270 healthy controls evaluated the upper metastable limit osmolality after water evaporation from urine sample to the onset of spontaneous crystallization [3]. The urine samples of stone formers were found to require lower volume reduction to induce spontaneous crystallization than those of controls. The cut-off value of 2696 mOsm/kg at spontaneous crystallization conferred optimal sensitivity and specificity of 0.8638 and 0.8189, respectively, with an area under ROC

of 0.93. While 24-h UOsm only reflects the current hydration status and requires regular reassessment, upper metastable limit osmolality might evaluate individual lithogenic capability and identify patients needing more aggressive hydration therapy.

Like all urine parameters, 24-h UOsm is influenced by day-to-day variations in diet and fluid intake. More than one 24-h urine samples are usually required for accurate evaluation of urine chemistry [4]. In the current study, the authors did not specify whether a repeated 24-h urine sample was obtained from the patients. Collecting 24-h urine samples at every follow-up visit could be inconvenient; additional studies are, hence, needed to determine whether spot urine UOsm at multiple time points could be alternative to 24-h UOsm, so as to improve patient’s compliance. Although closely correlated with the total amount of urine solutes, UOsm is not the only determinant of stone formation. Urine PH, GI Anion absorption, and urine composition all have substantial impact on crystallization [5, 6]. As supersaturation is the direct driving force of stone occurrence, saturation of stone-forming constituents (urine calcium, oxalate, phosphate, uric acid, etc.) more accurately reveals the likelihood of stone recurrence with regards to different stones types. Given the limited clinical evidence at present, the value of 24-h UOsm as an independent predictor of urolithiasis has not been well validated. We would, therefore, suggest 24-h UOsm to be used in combination with the other aforementioned parameters, such as urine PH, solute saturations, and perhaps upper metastable limit osmolality.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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