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Uric Acid Crystalluria following the Recovery Phase of Diabetic Ketoacidosis (DKA): A Lesser-known Complication of DKA

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Key words: crystalluria, uric acid, diabetic ketoacidosis

The occurrence of hyperuricemia is frequently associated with diabetic ketoacidosis (DKA),[1] however, crystalluria from the precipitation of calcium oxalate, uric acid, or urate crystals, is less known. Metabolic derangements during DKA, especially acidic urinary pH and hyperuricosuria are the main risk factors for uric acid crystals and stones.[2] Here we report a case of uric acid crystalluria following the recovery phase of DKA.

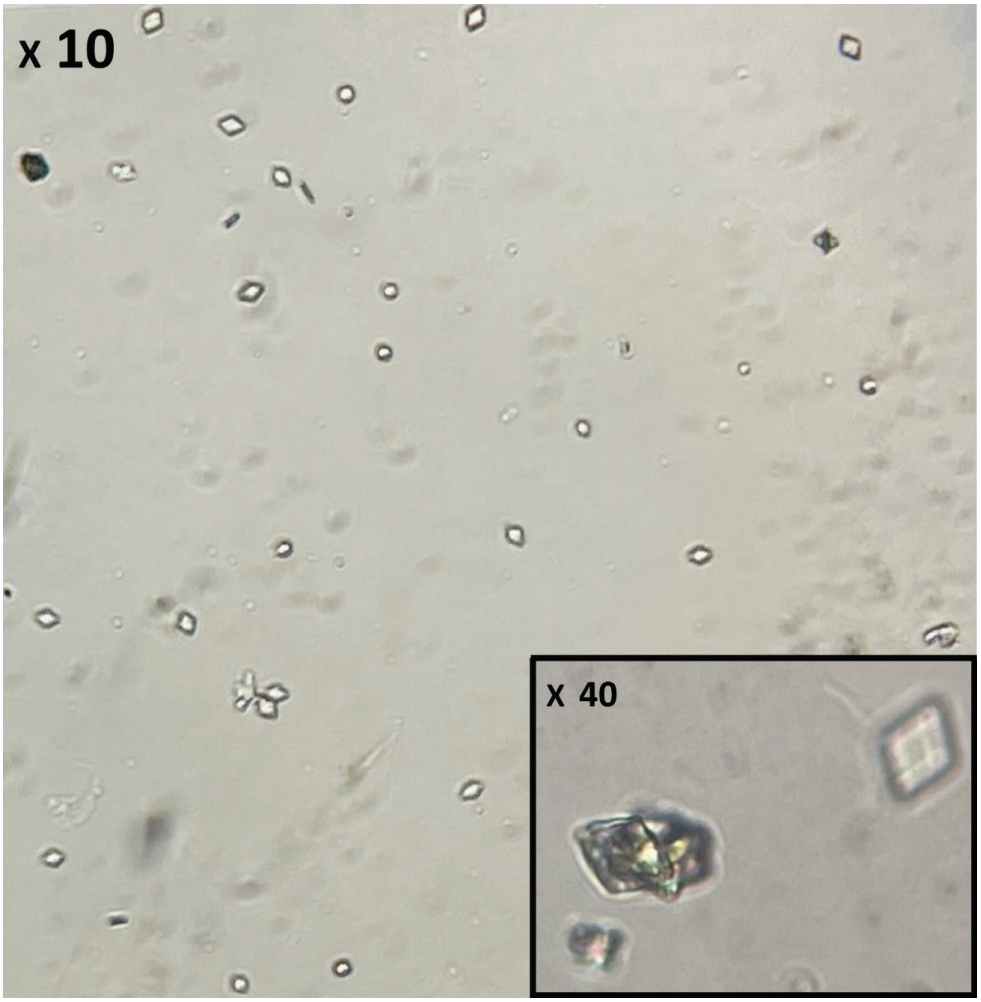

Figure 1. Urine sediment displays different types of shapes: barrel, plate-like, or diamond, consistent with uric acid crystals (x10); Diamond and rhomboid-shaped uric acid crystals at a higher magnification (x40).

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A 72-year-old male with persistent poorly controlled Type 2 DM was admitted due to COVID-19 pneumonia and severe DKA. On admission, his baseline serum creatinine increased from 1.3 mg/dL to 2.1 mg/dL. After intravenous insulin infusion and hydration, DKA was resolved after 15 hours with improved renal function to baseline. After DKA resolution, urinalysis showed an incidental finding of uric acid crystal particles with an acidic urine pH of 5.0. The concurrent level of plasma uric acid was within normal (6.6 mg/dL). Plain abdominal CT revealed no stones in the renal medulla or ureters. However, earlier blood samples on admission showed markedly elevated plasma uric acid levels (12.1 mg/dL). Further investigations revealed increased fractional excretion of uric acid from 7.4% at admission to 15.7% on the second day, indicating hyperuricosuria. With adequate diuresis and supportive treatment, crystalluria disappeared within 48 hours and he was discharged after 10 days. Our case highlights the importance of urine microscopy examination in patients with severe DKA to detect crystalluria which might contribute to renal impairment or nephrolithiasis following the recovery phase of DKA if left unchecked.[3] Clinicians should consider hyperuricemia which could lead to uric acid nephropathy from kidney stone as a late complication of DKA.

Ethical Consideration
Patient consent was obtained before submission of the manuscript.

Statement of Authorship
All authors certified fulfillment of ICMJE authorship criteria.

CRediTAuthor Statement
YT: Conceptualization, Methodology, Validation, Data curation, Writing – original draft preparation, Visualization, Funding acquisition; **NT:** Investigation, Project administration; **WK:** Software, Resources, Writing – review and editing, Supervision.

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