

# Exercise-Related Acute Kidney Injury: A Case of Renal Hypouricemia

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To the Editor,

Hypouricemia is a uric acid level below 2 mg/dL. Hereditary renal hypouricemia is a rare disease that causes increased kidney clearance of uric acid as a result of impaired uric acid absorption in the proximal tubule and consequently hypouricemia. It occurs as a result of impaired transport of uric acid in the proximal tubule due to mutations in the SLC22A12 gene encoding urate transporter 1 (URAT1) and the SLC2A9 gene encoding the glucose transporter gene GLUT9.<sup>1</sup> Exercise-related acute kidney injury (AKI) has been reported in these patients. We aimed to present a case of renal hypouricaemia presenting with exercise-related AKI.

A 24-year-old male patient presented to the emergency department with complaints of weakness, abdominal pain, bilateral flank pain, and decreased urine output after heavy exercise. It was learned that the patient presented with similar complaints 2 years ago, was followed up for AKI, and the creatinine value regressed from 3 mg/dL with hydration. While uric acid levels were 0.1-0.6 (3.4-7) mg/dL in the previous hospitalization, creatinine level was 0.8 (0.7-1.2) mg/dL and uric acid level was 0.1 mg/dL at the last outpatient clinic visit 3 months ago. Tests performed at the time of admission revealed; urea:105 (19-48) mg/dL, creatinine:4.9 mg/dL, albumin:4.4 (3.5-5.2) g/dL Na:133 (136-145) mEq/L, K:3.9 (3.5-5.1) mmol/L, Ca: 8.9 (8.6-10.5) mg/dL, P: 7.2 (2.5-4.5) mg/dL,

Mg: 2.9 (1.6-2.6) mg/dL, CK: 390 (39-308) U/L, LDH: 204 (135-214), uric acid: 2.5 mg/dL. Urine tests revealed pH 6, erythrocyte 49, leukocyte 15, hemoglobin +++, protein +, density 1012, protein in 24-hour urine 153.7 mg/day, uric acid in 24-hour urine 599.1 mg/day. Fractional uric acid excretion was 115.4% (5-11%), ANA was 1/100+, ANCA was negative, ENA panel was negative, C3 was 0.8 (0.7-1.5) g/L, and C4 was 0.17 (0.16-0.38) g/L. Sequential CK and LDH values were normal. Urinary ultrasonography was normal. Serum creatinine value increased up to 7.9 mg/dL during follow-up. Intermittent hemodialysis was required. After excluding all causes of prerenal and postrenal AKI, we thought that the history and laboratory findings were compatible with renal hypouricemia. There was no known drug or herbal product use. It was learned that our patient's parents were relatives, but there was no family member with a similar history. During follow-up, the patient no longer needed dialysis.

The diagnosis of hereditary renal hypouricemia is established with a decrease in serum uric acid level, an increase in fractionated uric acid excretion, and the absence of another condition that may cause hypouricaemia.<sup>1</sup> Patients with renal hypouricaemia may present with exercise-related AKI. More than 90% of patients are male.<sup>2</sup> Acute kidney injury occurs mostly after strenuous exercise such as short-distance racing. Symptoms, including abdominal pain and nausea can occur 6-12 hours after exercise. The underlying pathogenesis is



still unsolved. Uric acid is a powerful antioxidant with a protective role in the kidney. It is thought that decreased antioxidant capacity and reactive oxygen species formed as a result of renal hypouricemia may play a role in the pathogenesis of kidney damage.<sup>3</sup> Written informed consent was obtained from the patient who agreed to take part in the study.

In a study in which 54 patients with a diagnosis of renal hypouricemia and exercise-induced AKI were examined, it was observed that the kidney functions of the patients normalized after the first attack, and hemodialysis was performed in 12 patients. During follow-up, it was observed that 13 patients developed AKI again.<sup>4</sup>

Hence, hypouricemia should not be overlooked in cases of exercise-associated AKI.

**384 Informed Consent:** Written informed consent was obtained from the patient who agreed to take part in the study.

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