



An infant with hyponatremia, hyperkalemia, and metabolic acidosis associated with urinary tract infection: Questions

Bahriye Atmis¹ · İhsan Turan² · Engin Melek¹ · Aysun Karabay Bayazit¹

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A 2.5-month-old girl was admitted to our emergency department with a 1-day history of fever and vomiting. She was born at the 35th week of gestation by cesarean section and admitted to the neonatal intensive care unit. Her past medical history was significant for urinary tract infection in the neonatal period and congenital anomalies of the kidney and urinary tract (CAKUT), which was completely identified at 4 weeks of age. She had antenatal hydronephrosis and was diagnosed with right multicystic dysplastic kidney and severe left ureterovesical junction (UVJ) obstruction with imaging tests including ^{99m}Tc-mercaptoacetyltriglycine (MAG3) scintigraphy and voiding cystourethrography (VCUG). When she was 3 weeks old, a double J catheter was inserted due to severe left UVJ obstruction. VCUG did not demonstrate any vesicoureteral reflux (VUR). She was on prophylactic antibiotics. Her weight was 4210 g (3–10th percentile), height 56 cm (10th percentile), head circumference 37 cm (3–10th percentile), and blood pressure 110/70 mmHg (95th percentile 98/65 mmHg). She had signs of mild–moderate dehydration with dry mucosal membranes and normal female external genitalia on physical examination. While there was no abnormality in the previous biochemical parameters of the patient, the results of the laboratory examination at the time of admission were blood urea nitrogen (BUN), 25 mg/dl (5–20 mg/dl); serum creatinine, 0.34 mg/dl (0.3–1 mg/dl); sodium,

111 mmol/l (135–145 mmol/l); potassium, 7.4 mmol/l (3.5–5 mmol/l); chloride, 98 mmol/l (98–115 mmol/l); glucose, 88 mg/dl (50–90 mg/dl); hemoglobin, 13 g/dl; leukocytes, 16,870/mm³ (7000–15,000/mm³); and platelets, 656,000/mm³ (150,000–450,000/mm³). Hormonal analysis showed elevated plasma renin > 500 pg/ml (2.77–61.8 pg/ml) and serum aldosterone >1500 pg/ml (50–900 pg/ml). Random adrenocorticotropic hormone (ACTH) was 30.8 pg/ml (8.6–46.3 pg/ml) and cortisol was 7.2 µg/dl (1–24 µg/dl). Venous blood gas analysis was pH 7.20, pCO₂ 38 mmHg, bicarbonate 11 mmol/L, and base excess – 13 mmol/L. Her urine analysis results were pH 5, density 1025, leukocyte esterase (+++) positive, nitrite positive, and leucocyturia with bacteriuria in microscopic examination. She was hospitalized with a diagnosis of acute pyelonephritis.

Questions:

1. What is your diagnostic approach to hyponatremia and hyperkalemia?
2. What is the diagnosis?
3. How should this patient be treated?

Compliance with ethical standards

Conflict of interest None to declare.

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✉ Bahriye Atmis
bahriyeatmis@gmail.com

¹ Faculty of Medicine, Department of Pediatric Nephrology, Cukurova University, Adana, Turkey

² Faculty of Medicine, Department of Pediatric Endocrinology, Cukurova University, Adana, Turkey