Hypokalemic paralysis in a girl with dental and renal calculi: Questions

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Case summary

A 15-year-old Chinese girl presented to the emergency department with muscle paralysis of bilateral lower extremities over the course of 1 day. She had a 2-year history of polyuria, nocturia, and rampant dental caries and calculi. She denied vomiting, diarrhea, or use of alcohol, laxatives, or diuretics, and her family history was unremarkable.

Her pulse rate was 90/min, blood pressure 112/72 mmHg, and body temperature 36.4 °C. Physical examination revealed severe dental caries and calculi (Fig. 1a) with dry oral mucosa. Her thyroid gland was not enlarged. Neurologic examination disclosed symmetric flaccid paralysis with areflexia of both lower extremities. The remainder of the physical examination was unremarkable. The most striking biochemical abnormalities were profound hypokalemia (1.8 mEq/l) and hyperchloremic metabolic acidosis (pH 7.28, HCO_3^- 16.6, Na^+ 141 and Cl^- 114 mEq/l). Her renal, liver, and thyroid function were all normal (creatinine 0.9 mg/dl). Urinalysis revealed proteinuria (1+), low urine

specific gravity (1.010), high K^+ excretion (transtubular K^+ gradient 5, 24-h urine K^+ 38 mEq/day), positive urine anion gap (Na^+ 43, K^+ 16 and Cl^- 39 mEq/l) and persistent alkaline urine (pH 7–7.5). Electrocardiogram revealed prolonged PR interval with flattened T wave. Abdominal ultrasonography showed bilaterally medullary nephrocalcinosis (Fig. 1b).

Questions:

1. What is the cause of her hypokalemic paralysis?
2. What is the link between her renal and dental problems?
3. How should this patient be treated?

Fig. 1 Plain film showing rampant dental caries and calculi (a) and ultrasonography showing bilateral medullary nephrocalcinosis (b)

The answers to these questions can be found at <http://dx.doi.org/10.1007/s00467-012-2253-2>.

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