

American Society of Nephrology – Renal Week 2010
Nephrology Quiz and Questionnaire: Electrolytes Questions
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Case 1

A 51-year old man is seen in the Emergency Room after developing a seizure attributed to hypoglycemia. The patient was well until 3 days ago when he noticed the onset of nausea and decreased appetite. One day later, he developed unsteadiness of gait and complained he felt the room was spinning around him. There was one episode of emesis. On the day of admission, he experienced a witnessed generalized tonic clonic seizure. Paramedics found him unarousable upon arrival. A serum glucose was measured at 23 mg/dL by fingerstick. After administration of two ampoules of 50% Dextrose in Water, his mental status rapidly improved, and he was transported to the hospital.

The past medical history is significant for Type 2 diabetes mellitus, hypertension, psoriasis, and excessive alcohol intake (6 beers daily) on weekends. His current medications include metformin 500 mg BID and losartan 100 mg qd. He had been training intensively for a 10K run over the last month. He applies Ben-Gay ointment and a heating pad over his lower extremities each evening after running due to nonspecific joint and muscle pain.

Physical examination shows a BP 110/72 mmHg, pulse 110 beats/min, and respiratory rate 26/minute. There were skin changes typical of psoriasis on both elbows and knees. The remainder of the exam was normal. Upon completion of the physical examination, the patient was noted to become less arousable but quickly responded to an additional ampoule of 50% Dextrose in Water followed by a continuous infusion of 10% Dextrose in Water.

Laboratory data obtained immediately after arrival to the emergency room is given in Table 1.

Question 1: Which ONE of the following disorders can BEST explain the clinical findings in this patient?

- A. Metformin toxicity
- B. Alcoholic ketoacidosis
- C. Diabetic ketoacidosis
- D. Salicylate toxicity
- E. Isopropyl alcohol ingestion

Table 1 – Case 1 Laboratory Data

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| Creatinine (mg/dL) | 1.8 |
| BUN (mg/dL) | 34 |
| Serum electrolytes (mEq/L): Na ⁺ K ⁺ Cl ⁻ HCO ₃ Glucose (mg/dL) | 143 2.5 107 15 33 |
| Urine electrolytes (mEq/L): Na ⁺ K ⁺ Cl ⁻ | 65 40 15 |
| Urinalysis and urine culture | Specific gravity: 1.024, pH 5.5, trace protein, 2+ ketones, no cells or casts |
| Arterial blood gas | pH 7.45, pCO ₂ 20, pO ₂ 78 |
| Other tests (serum) | Osmolality 298 mOsm/kg H ₂ O, uric acid 1.5 mg/dL, ketones 1+ (undiluted) |

Case 2

A 32-year old woman presents to the Emergency Room with a two-day history of increasing generalized weakness that progressed to the point of not be able to stand without assistance. The patient is known to have bipolar disorder with episodes of depression and manic episodes for which she is treated with quetiapine 300 mg daily. Approximately one week ago, risperidone was added to her regimen due to severe depression manifested as psychomotor retardation. One day prior to admission, she had one episode of emesis but denied diarrhea. The past medical history is significant for peptic ulcer disease for which she takes pantoprazole. An accompanying family member states the patient has been taking a large quantity of an over-the counter analgesic for chronic headache.

On physical examination: temperature 37 C, blood pressure 116/78 mmHg, pulse 104 beats/min, respiratory rate 20/min. Strength is noted to be symmetrically reduced in all extremities with proximal weakness greater than distal. The remainder of the exam is normal. The laboratory data is given in Table 2.

Question 2: Which ONE of the following disorders BEST accounts for the clinical findings in this patient?

- A. Quetiapine toxicity
- B. Rhabdomyolysis
- C. Ibuprofen toxicity
- D. Acetaminophen toxicity
- E. Pantoprazole toxicity

Table 2 – Case 2 Laboratory Data

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| Creatinine (mg/dL) | 1.2 |
| BUN (mg/dL) | 24 |
| Serum electrolytes (mEq/L): Na ⁺ K ⁺ Cl ⁻ HCO ₃ Albumin (g/dL) Ca (mg/dL) PO ₄ (mg/dL) Glucose (mg/dL) | 138 2.6 110 14 4.2 9.0 1.8 104 |
| Urine electrolytes (mEq/L): Na ⁺ K ⁺ Cl ⁻ | 45 40 80 |
| Arterial blood gas | pH 7.35, pCO ₂ 29 torr, pO ₂ 98 torr |
| Urinalysis | Specific gravity 1.012, pH 5.5, 1+ glucose, trace protein, trace blood, no cells |