

## National Pediatric Nighttime Curriculum Q&A for Abnormal Sodium

### Questions

- 1) A 1 month old patient with RSV bronchiolitis and dehydration develops vomiting and altered mental status leading to generalized tonic-clonic seizure. Her serum sodium is 118 mEq/L. The most likely mechanism for her clinical deterioration is:
  - A) Demyelination
  - B) Cerebral edema
  - C) Brainstem herniation
  - D) Intracranial hemorrhage
  
- 2) The goal rate of correction for a patient with a serum sodium of 165 mEq/L who is hemodynamically stable is:
  - E) As quickly as possible
  - F) 0.01 mEq/hour
  - G) 0.5 mEq/hour
  - H) 2 mEq/hour
  
- 3) A 3 year old is admitted with gastroenteritis and dehydration. His serum sodium is 167 mEq/L. Once he is hemodynamically stable, fluid management should be focused on providing:
  - A) Glucose
  - B) Free water
  - C) Sodium
  - D) Potassium
  - E) Chloride
  
- 4) All of the following are possible etiologies for hyponatremia EXCEPT:
  - A) Dilute formula feeding
  - B) SIADH
  - C) Diabetes insipidus
  - D) Non-osmotic release of ADH secondary to acute illness
  
- 5) A 2 year old patient with central diabetes insipidus is admitted with a sodium of 170 mEq/L. The lab findings most consistent with his diagnosis are:
  - A) Elevated serum osmolarity and concentrated urine
  - B) Decreased serum osmolarity and dilute urine
  - C) Decreased serum osmolarity and concentrated urine
  - D) Elevated serum osmolarity and dilute urine
  
- 6) A 4 month old has been receiving improperly mixed formula with 1 scoop per 4 oz of water. She presents with generalized tonic-clonic seizure and a serum sodium of 118 mEq/L. The appropriate fluid to use for immediate management of her hyponatremia is:
  - A) Normal saline
  - B) ½ Normal saline
  - C) 3% Hypertonic saline
  - D) None-fluid restrict due to concern for SIADH

## Answers

1)

- A) Incorrect. Demyelination can occur as result of hyponatremia, but it usually presents several days following the change in sodium with confusion, pseudocoma or a “locked-in” state. Recent data suggests that it is not the rate of correction that leads to demyelination, rather the magnitude of correction necessary and the underlying illness.
- B) Correct. Hyponatremia leads to an influx of fluid from the extracellular space to the intracellular space cause cerebral edema. Early neurologic manifestations including headache, vomiting, seizure and altered mental status are a direct result.
- C) Incorrect. Cerebral edema from hyponatremia can lead to brainstem herniation, but this would present with respiratory arrest, asymmetric pupillary changes or decorticate posturing.
- D) Incorrect. Hyponatremia rarely leads to intracranial hemorrhage. Hypernatremia can cause this due to acute loss of brain volume from loss of fluid from the intracellular space leading to rupture of cerebral veins.

2)

The correct answer is C. This is a straight forward knowledge question, requiring the learner to recall the goal rate of sodium correction in a patient with hypernatremia who is hemodynamically stable.

3)

B is the correct answer. Hypernatremia is a total body free water deficit rather than an excess of sodium.

4)

C is the correct answer. Diabetes insipidus leads to hypernatremia.

5)

D is the correct answer. Central diabetes insipidus leads to decreased ADH production. This leads to an inability to concentrate urine and an increase in serum osmolarity, hypernatremia and dilute urine.

6)

C is the correct answer. This is a straightforward knowledge question requiring learners to recall that symptomatic hyponatremia is an emergency requiring prompt treatment with hypertonic saline.