

A 17-year-old male was brought in by friends after he was found unresponsive in his mother's bathroom during a house party. Vitals on arrival are T 35.5C, HR 51, BP 89/53, RR 12, O2sat 81% on room air. Exam is remarkable for stupor, miosis, bibasilar rales, and hyporeflexia. Bag-mask ventilation is initiated.

Which of the following is the best next step in management?

- a. Toxicology testing
- b. Activated charcoal administration
- c. Naloxone administration
- d. Flumazenil administration
- e. Intubation

Answer: **c. Naloxone administration**

This presentation is most consistent with opioid intoxication, and naloxone is the antidote of choice. It can rapidly reverse the effects of opioids, although its short half-life means multiple doses may be required.

- In this stuporous patient with respiratory depression and hypoxia, the airway is a real concern. However, because of the efficacy and rapid onset of naloxone, it is prudent to continue bag-mask ventilation and administer naloxone first if it is readily available. If there is limited response, it is appropriate to intubate at that time.
- Activated charcoal is indicated for GI decontamination in children. However, it is contraindicated in stuporous or comatose patients due to risk of aspiration.

- Toxicology testing is an important part of the management of this patient, but is not the most immediate need, especially in the setting of signs and symptoms consistent with opioid toxicity.
- Flumazenil is indicated for benzodiazepine overdose, which classically presents as CNS depression with normal vital signs. In combination with ethanol or other CNS depressants, it can cause similar signs/symptoms as opioids including respiratory depression. However, if the substances ingested are not known, flumazenil is relatively contraindicated because blocking benzodiazepine effect may induce seizures if a seizure threshold-lowering agent was ingested.

References:

- **UpToDate** (Opioid Intoxication in Children and Adolescents, Benzodiazepine Poisoning and Withdrawal, Decontamination of Poisoned Children)

A 5-week-old infant was brought in by mother for fussiness and lethargy for the last 30 minutes. Mother reports that he was previously healthy, and has had such a good appetite that she is running out of formula. As you are about to exam the baby, he has a generalized tonic-clonic seizure. The baby is found to be afebrile with normal blood glucose and CT brain.

Which of the following is most likely to be present in this patient?

- a. Hypothermia
- b. Elevated urine osmolality
- c. Elevated CSF protein
- d. Hyperammonemia
- e. Retinal hemorrhages

Answer: **a. Hypothermia**

This baby presents with altered mental status and seizures, with normal glucose and CT brain. This presentation is most consistent with euvolemic hyponatremia due to water intoxication, especially given the history that mother is running out of formula and may be diluting it. Hyponatremia is well-documented to be associated with hypothermia.

- Urine osmolality may be elevated with hyponatremia if the patient has SIADH. In this patient, the history points toward hyponatremia due to overingestion rather than undersecretion of water.
- Elevated CSF protein is expected in meningoencephalitis, which is less likely in this afebrile patient.
- Hyperammonemia is a possible cause of seizures in patients with liver disease or uremia, but is less common than hyponatremia in infancy.
- A high index of suspicion for abusive trauma should always be maintained, but is less likely in this patient with normal CT brain (although a normal CT does not at all exclude abusive trauma as a possibility).

References:

- **UpToDate** (Acute Toxic-Metabolic Encephalopathy in Children, Causes of Hyponatremia, Evaluation of the Patient with Hyponatremia, Manifestation of Hyponatremia and Hypernatremia, Evaluation and Diagnosis of Abusive Head Trauma in Infants and Children)
- **PREP 2012 Question 243**