

# Hyponatremia, Hypokalemia, Hypochloremia, and Other Abnormalities

Zahra Shajani-Yi, Hong Kee Lee, and Mark A. Cervinski\*

## CASE DESCRIPTION

A 22-year-old man with superior mesenteric artery (SMA) syndrome, an unusual cause of proximal intestinal obstruction, and recent unintentional weight loss of 35 pounds (body mass index 15.8) presented to the emergency department with weakness and constipation. Results from a comprehensive metabolic panel are shown in Table 1. Liver enzymes, glucose, calcium, and anion gap were all within reference intervals.

Item	Result	Reference interval
Sodium, mmol/L	132	135-145
Potassium, mmol/L	1.8	3.5-5.0
Chloride, mmol/L	69	98-107
CO <sub>2</sub> , mmol/L	50	22-31
Anion gap	13	5-15
Blood urea nitrogen, mg/dL	33	10-20
Creatinine, mg/dL	1.31	0.8-1.50

## QUESTIONS

1. What acid-base disturbance does the patient most likely have?
2. What is the mechanism for this disturbance?
3. What is the appropriate treatment regimen?

*The answers are below.*

## ANSWERS

The extremely high bicarbonate and low chloride are almost certainly due to metabolic alkalosis caused by vomiting associated with SMA syndrome (1). The loss of gastric fluid results in metabolic alkalosis caused by the loss of H<sup>+</sup> and subsequent increase in serum bicarbonate; this alkalosis is maintained and potentiated by the kidney's inability to excrete excess bicarbonate because of hypochloremia. Hypokalemia is frequently associated with metabolic alkalosis because kaliuresis

is increased in response to low H<sup>+</sup> concentration (2). Treatment with saline and potassium chloride replenishes chloride and allows subsequent renal excretion of excess bicarbonate.

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The Geisel School of Medicine at Dartmouth and Dartmouth-Hitchcock Medical Center, Lebanon, NH.

\* Address correspondence to this author at: The Geisel School of Medicine at Dartmouth and Dartmouth-Hitchcock Medical Center, One Medical Center Dr, Lebanon, NH 03756.

Fax 603-650-4845; e-mail mark.a.cervinski@hitchcock.org.

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