


 > THE PATIENT

26-year-old woman

## &gt; SIGNS &amp; SYMPTOMS

- Nausea and vomiting
- Currently breastfeeding
- Ketogenic diet

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## &gt; THE CASE

A 26-year-old woman presented to the emergency department (ED) with a history of nausea and vomiting for more than 24 hours. The vomiting began when she awoke to breastfeed her 3-month-old infant. She had been unable to eat or drink anything for about 16 hours.

She'd seen her primary care provider earlier in the day. Antiemetics were prescribed, but they did not provide relief. So 10 hours later, when her symptoms worsened, she presented to the ED.

Her medical history was notable for a body mass index of 26. The patient also reported positional back pain, but the review of systems was otherwise negative. The patient indicated that she'd been on a ketogenic diet for about 1 month, but she denied use of supplements.

Upon presentation to the ED, the patient was found to have a metabolic acidosis with a pH of 7.02 and an anion gap of 25. Her glucose level was 132 mg/dL, and she had a positive serum acetone and a beta-hydroxybutyrate level of 75 mg/dL (reference range, 0-2.8 mg/dL). Her salicylate testing was negative, and her lactate level was 1.4 mmol/L (reference range, 0.4-2.0 mmol/L).

## THE DIAGNOSIS

This patient, with severe acidosis and an elevated anion gap, received a diagnosis of starvation ketoacidosis—specifically, lactation ketoacidosis. Other causes of elevated anion gap metabolic acidosis were ruled out, including salicylate overdose, lactic acidosis, diabetic ketoacidosis, and other ingestions. The elevated acetone and beta-hydroxybutyrate levels confirmed the diagnosis. The patient was treated with a bolus of 1 L normal saline with 5% dextrose (D5NS) in the ED and admitted.

## DISCUSSION

Lactation ketoacidosis is a relatively uncommon condition, but reports have increased with the growing popularity of low-carbohydrate diets. The treatment approach has differed in previous reports in regard to insulin and bicarbonate use.<sup>1-9</sup>

The use of bicarbonate is controversial in diabetic ketoacidosis and unlikely to be helpful in lactation ketoacidosis, but it is something to consider when the patient's pH is < 6.9. Insulin use is likely unnecessary for lactation ketoacidosis, as metabolic derangements have been corrected without intervention.

With an increasing prevalence of cases, we suggest a conservative approach for treatment based on this case presentation and review of other presentations. Our patient responded rapidly to conservative treatment with intravenous (IV) fluids (D5NS), a liberalized diet, and electrolyte repletion (described in detail later).

CONTINUED

➤ **Lactation ketoacidosis is a relatively uncommon condition, but reports have increased with the growing popularity of low-carbohydrate diets.**

## Suggested management

Once other causes of a patient's signs and symptoms are excluded and the diagnosis of lactation ketoacidosis is made, you'll want to follow the initial set of lab work with the following: a venous blood gas, basic metabolic panel, and testing of magnesium and phosphorous levels every 8 hours after initial presentation, with repletion as indicated. Some patients may require more frequent monitoring based on repletion of electrolytes.

The patient will initially require IV fluid resuscitation; the initial fluid of choice would be D5NS. Patients will likely need no more than 2 L, but this will depend on the degree of hypovolemia.

Diet should be advanced as tolerated and include no restriction of carbohydrates.

Previous reports have varied regarding continuation of breastfeeding and pumping. In this case, the patient continued to breastfeed without any adverse effects. Continuation of breastfeeding is unlikely to cause harm in these circumstances, but severity of symptoms (pain, nausea, vomiting) or unresolved acidosis may require discontinuation.

Discharge should be determined by resolution of symptoms and correction of metabolic derangements. In previous reports, discharge time varied from 48 hours up to 144 hours, with most patients discharged on Day 2 or 3. Pending clinical factors, discharge is likely appropriate between 36 to 72 hours from time of admission.

■ **Our patient** received an additional 1 L of D5NS for continued signs of dehydration during admission. Her pH and electrolyte levels were monitored every 8 hours, with repletion of electrolytes as needed. Her acidosis, nausea, vomiting, and pain resolved within 36 hours. The patient continued to breastfeed her infant throughout her stay. With resolu-

tion of symptoms and metabolic derangements, the patient was discharged about 36 hours after admission. She was advised to follow up with her primary care provider within 1 week after discharge.

## THE TAKEAWAY

As the popularity of low-carbohydrate diets increases, patients should be educated about the warning signs of clinically significant ketoacidosis. This information is especially important for those who are lactating, as this metabolic state increases predilection to ketoacidosis. When cases do present, conservative management with IV fluids and a liberalized diet is likely to be an appropriate course of care for most patients. **JFP**

### CORRESPONDENCE

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